

CANYON GENERAL IMPROVEMENT DISTRICT WATER CONSERVATION PLAN



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PREPARED FOR:

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INTRODUCTION (NRS 540.121)

This water conservation plan has been prepared for the Canyon General Improvement District Public Water System (Canyon GID). The purpose of the water conservation plan is to continue to encourage a more efficient use of water within the Canyon GID service area and comply with Nevada Revised Statutes 540.121 through 540.151 (code is indicated throughout this plan in bold/italics). Canyon GID supplies water for municipal and domestic purposes and by state law (as indicated below) is required to submit a water conservation plan for its service area.

NRS 540.121 "Supplier of water" defined.

As used in NRS 540.121 to 540.151, inclusive, "supplier of water" includes, but is not limited to:

- 1. Any county, city, town, local improvement district, general improvement district and water conservancy district;***
- 2. Any water district, water system, water project or water planning and advisory board created by a special act of the Legislature; and***
- 3. Any other public or private entity, that supplies water for municipal, industrial or domestic purposes. The term does not include a public utility required to adopt a plan of water conservation pursuant to NRS 704.662. (Added to NRS by 1991, 520)***

The small (predominately residential) community of Lockwood is located within Storey County, just east of Sparks, Nevada. Canyon GID supplies residents of this community with their water, wastewater, trash removal, television, and streets (only within the Rainbow Bend Community) & storm drains services. New construction in the service area has slowed dramatically and the district is almost at build-out.

Canyon GID currently has 502 residential connections and 23 commercial connections (total of 13 commercial customers, of which, one has multiple irrigation meters) serving approximately 1,310 persons. Water is supplied via two drilled underground wells, two water treatment facilities, two storage tanks, and distribution pipelines. Wastewater collected from the area is currently managed through a treatment facility and leech fields. Canyon GID recently began selling treated effluent to the nearby landfill. The landfill is able to use all but five percent of the effluent generated by the plant.

The district is approaching a build-out status within its own service area boundaries, and new developments are not anticipated at the present time. Although population growth, in the near future, is not anticipated to unduly burden the water capabilities of the Canyon GID water system, it will result in an increased water demand over time. As the demand for water increases, new facilities will need to be constructed/maintained and new sources of water will need to be developed. Financial savings is possible through water conservation if upgrades or new infrastructure can be deferred.

The primary water conservation goals for Canyon GID are listed below. Some of these goals involve ongoing efforts and others are one-time projects that will improve the abilities of Canyon GID to manage available water and reduce the amount of water waste.

- Canyon GID will increase public awareness of the limited supply of water in Nevada and the need to conserve water.

- Canyon GID will encourage the reduction in lawn sizes and the use of native plants/drought tolerant plants. To prevent water waste from irrigation overspray, Canyon GID will educate users in practical locations and sizes for turf in order to avoid areas that are difficult to water (narrow, strip, or odd shaped turf.)
- Canyon GID will strive to reduce water waste and reduce consumption by 5% by the year 2013 (savings of 3,000,000 gallons per year.)
- Canyon GID will continue to maintain accurate water pumping and usage records in order to identify and reduce water leakages and inaccuracies in the water system (distribution lines, water meters, etc.)
- Canyon GID will draft and implement a staged contingency plan for drought conditions. This plan will be approved by the Board and be included within the Canyon GID Tariffs (Tariffs).
- Canyon GID will periodically review and evaluate water conservation measures and incentives for effectiveness and determine if revisions or continuations to the programs will be made.
- Canyon GID will continue to train management and existing key personnel in water conservation measures, management practices, and techniques.
- Canyon GID currently utilizes an increasing block rate water structure which, in itself, helps to conserve water by charging customers based on the amount of water that is actually used.
- Canyon GID will update the water conservation plan every five years (as required by NAS 540.131.4.c.)
- Canyon GID currently reclaims 85% of its backwash water for the filters in both water treatment plants.

Since 2008, Canyon GID has achieved several of the goals included in that year's revision of the conservation plan. Goals achieved since that time include effluent reuse, an odd/even irrigation schedule, and a schedule of penalties/fines for water wasting violations.

This plan includes information to help water customers in the Canyon GID service area continue to conserve water. The plan can be used as a resource to implement and measure the effectiveness of conservation efforts and can provide a planning guide for future conservation. The following is included in this water conservation plan prepared for Canyon GID:

- Conservation Goals
- Existing and Planned Conservation Measures and Incentives
- Educational Materials/Examples

This plan is compliant with Nevada Revised Statutes (NRS) sections 540.121 through 540.151 and is available for public inspection at the following location:

**Canyon General Improvement District
800 Peri Ranch Road Ste. 103
Sparks, Nevada 89434
(775) 342-2850**

Public comments about this plan are encouraged. Written comments may be sent to the address above.

Canyon GID supplies water for municipal purposes and is required to submit a water conservation plan to the State for approval. Canyon GID's current water conservation plan was submitted in 2001. This water conservation plan is an update to that plan (as required every five years.) Following is the code from the water conservation portion of the Nevada Revised Statutes and it's applicability to Canyon GID.

NRS 540.131 Plan of water conservation: Procedure for adoption and updating of plan; review of plan by Section; joint plans permitted by certain suppliers; duties of local governing body.

1. Except as otherwise provided in subsection 5, each supplier of water which supplies water for municipal, industrial or domestic purposes shall, on or before July 1, 1992, adopt a plan of water conservation based on the climate and the living conditions of its service area in accordance with the provisions of NRS 540.141, and shall update the plan pursuant to paragraph (c) of subsection 4. The provisions of the plan must apply only to the supplier's property and its customers. The supplier of water shall submit the plan to the Section for review by the Section pursuant to subsection 3.

2. As part of the procedure of adopting a plan, the supplier of water shall provide an opportunity for any interested person, including, but not limited to, any private or public entity that supplies water for municipal, industrial or domestic purposes, to submit written views and recommendations on the plan.

Canyon GID will provide an opportunity for any interested party to submit written views and recommendations on the plan. Canyon GID will have a public hearing on the water conservation plan and will notify the public of said hearing by posting the agenda in the normal locations to allow anyone interested in the water conservation plan to provide either written comment or personal testimony. Once the hearing is complete, Canyon GID will review all of the public comments and make any revisions it deems necessary.

3. The plan must be reviewed by the Section within 30 days after its submission and approved for compliance with this section and NRS 540.141 before it is adopted by the supplier of water.

4. The plan:

(a) Must be available for inspection by members of the public during office hours at the offices of the supplier of water;

Canyon GID will keep this water conservation plan in its office during regular business hours for public viewing. Members of the public are encouraged to make written views and recommendations on the water conservation plan. These written views should be sent to the Canyon GID office.

(b) May be revised from time to time to reflect the changing needs and conditions of the service area. Each such revision must be made available for inspection by members of the public; and

Canyon GID will revise this water conservation plan (as needed) to keep up with any changing needs and conditions of its service area. If any revisions are made to this water conservation

plan, such revision will be made available for inspection by members of the public in the Canyon GID office during regular business hours.

(c) Must be updated every 5 years and comply with the requirements of this section and NRS 540.141.

Canyon GID will update this water conservation plan at least every 5 years (in order to comply with State requirements). The next update to the plan will need to be approved by the State and completed in 2013.

5. Suppliers of water:

(a) Who are required to adopt a plan of water conservation pursuant to this section; and

(b) Whose service areas are located in a common geographical area may adopt joint plans of water conservation based on the climate and living conditions of that common geographical area. Such a plan must comply with the requirements of this section and NRS 540.141.

This water conservation plan is intended solely for use within the Canyon GID service area boundaries and does not include a joint effort with any additional water suppliers.

6. The board of county commissioners of a county, the governing body of a city and the town board or board of county commissioners having jurisdiction of the affairs of a town shall:

(a) Adopt any ordinances necessary to carry out a plan of conservation adopted pursuant to this section which applies to property within its jurisdiction;

Canyon GID will continue to adopt Rules and Regulations necessary to carry out the water conservation plan. The Rules and Regulations will be agreed upon and approved by the Canyon GID Board and will be included in its Tariffs. Included in **Appendix A** includes the rules and regulations for leak repair and landscape irrigation that were established in 2009.

(b) Establish a schedule of fines for the violation of any ordinances adopted pursuant to this subsection; and

Canyon GID has revised the Tariffs to include a section on penalties/fines for water wasting violations. The Schedule of Fines was agreed upon and approved by the Canyon GID Board. Including these fines in the Tariffs will allow Canyon GID to enforce the Rules and Regulations and will encourage its users against wasting water. Included in **Appendix A** are the rules and regulations for leak repair and landscape irrigation that were established in 2009.

(c) Hire such employees as it deems necessary to enforce the provisions of any ordinances it adopts pursuant to this subsection. (Added to NRS by 1991, 520; A 2005, 2570; 2007, 1253)

Due to the small size of the system, Canyon GID does not currently have personnel, procedures, or finances in place to monitor water waste full time; however, existing employees and individual members within the community report visible water wasting to the district's manager. In addition to this, Canyon GID employs a 24-hour patrol service that keeps an eye on the area and (if there is a problem) can report back to Canyon GID key personnel. Canyon GID does not have the financial capability of hiring employees for the sole purpose of water

conservation; however, there is value in training existing personnel in conservation management practices and techniques so that waste can be prevented and conservation related ordinances/rules can be enforced. Without this training the conservation and drought sections will be ineffective. Canyon GID sent key personnel to a water conservation class (November 2007) and will continue to actively train existing personnel in these conservation management practices and techniques. Also, the Canyon GID Manager does a monthly audit (when bills are produced) to determine if any excessive or “out-of-the-ordinary” usages are occurring with a customer. She then contacts the customer with questions and/or suggestions.

CONSERVATION PROVISIONS/MEASURES (NRS 540.141)

Canyon GID will continue to implement public education programs to increase awareness of the limited supply of water in the State of Nevada and the need to conserve water (as required by NRS 540.141.) Following is the code from the water conservation portion of the Nevada Revised Statutes and its applicability to Canyon GID.

NRS 540.141 Required provisions of plan or joint plan of water conservation; review by Section; posting of plans and joint plans on Internet website.

1. A plan or joint plan of water conservation submitted to the Section for review must include provisions relating to:

(a) Methods of public education to:

(1) Increase public awareness of the limited supply of water in this State and the need to conserve water.

A key objective of this plan is to increase public awareness of the limited supply of water in Nevada and the need to conserve water. A successful educational program provides information to the public that helps to motivate water users in their efforts to conserve water. The Canyon GID will continue to provide its customers with educational materials and resources including home & landscape guides, mailers (on at a minimum quarterly basis), and links to conservation websites. Example water conservation brochures and pamphlets are included in **Appendix B**. Regardless of the type of educational resources that are used, the most important consideration is their content and if the information is disseminated successfully. Specific water conservation incentives are included in the NRS 540.151 section of this plan.

(2) Encourage reduction in the size of lawns and encourage the use of plants that are adapted to arid and semiarid climates.

Water usage is much higher in the summer than the winter due to the watering needs of landscaping. For this reason, a landscaping code is a fundamental part of an effective water conservation plan. Landscape codes regulate new landscapes and the replacement of existing landscapes. The intent of the code is not to limit landscaping options, but to help customers optimize the efficiency of landscape water use. Examples of landscape codes are included in **Appendix C**.

Canyon GID does not have the authority to institute a landscaping code; it is the responsibility of the Homeowner's Association (HOA) for the two residential areas in Lockwood. Canyon GID, however, will encourage the reduction of the size of lawns and encourage the use of Xeriscaping™ methods and drought tolerant/native plants by providing education to its users through brochures in the monthly bills and conservation tips in its monthly newsletter. **Appendix D** gives a list of compatible shrubs, trees, and plants for the Canyon GID service area. Education will encourage Canyon GID customers to become more conscious about the types of plants that can be purchased that require the least amount of water and the locations where the plants are most suited for planting.

Canyon GID will continue to encourage the reduction of lawn sizes within its service area through education, incentives, a watering schedule of even/odd addresses, and instituting times during the day when watering is not allowed. In addition to including these rules in its Tariffs,

Canyon GID has implemented a schedule of fines to enforce the violation of any water wasting within its service area.

(b) Specific conservation measures required to meet the needs of the service area, including, but not limited to, any conservation measures required by law.

Water conservation measures are defined as a device/behavioral practice that is implemented by a water system/user that will result in a quantifiable/measurable amount of water savings or a more efficient use of water. Water conservation measures include “hardware” devices/equipment or behavioral/management practices that will directly save water. Examples of water conservation measures are listed below and are included in **Appendix E**:

- Residential (Indoor)
 - Hardware devices/equipment- installing low flow toilets, waterless and composting toilets and urinals, low-flow shower heads and faucets, water-efficient clothes washers and dishwashers, etc.
 - Behavioral/management practices- not using toilets for trash disposal, shutting off faucets when brushing teeth or performing other duties, washing only full loads of clothes, dishes, etc.
- Landscaping
 - Hardware devices/equipment- installing native/drought tolerant plants/landscaping (including Xeriscape™ techniques), drip irrigation, automatic shut-off hoses, rain sensors, etc.
 - Behavioral/management practices- watering less frequently, utilizing water efficient landscape maintenance practices, etc.
- Commercial/Industrial/Institutional
 - Hardware devices/equipment- using cooling towers with recycled water, reusing process water, leak repair within facility, etc.
 - Behavioral/management practices- shutting off unused valves, sweeping a sidewalk rather than washing with a hose, use water-efficient equipment, not serving water automatically in restaurants, etc.
- Water utilities
 - Hardware devices/equipment- leak detection and repair, hydrant capping, utilizing reused effluent, implementing water rate structures that promotes conservation, etc.
 - Behavioral/management practices- regularly service and adjust system valves and connections, reduce high pressure locations, etc.

Water conservation measures that are applicable to Canyon GID are listed as follows:

Canyon GID Residential Hardware/Device Conservation Measures

Canyon GID is a small water system that has limited regulatory authority and finances. Conservation measures involving retrofitting equipment/devices are expensive; therefore, a cost-benefit analysis would need to be performed before implementation of any such program to evaluate its effectiveness.

Canyon GID management has indicated that a shower head replacement program (retrofitting old shower heads that use more water for new ones supplied by the District that conserve water) is one program that is currently being looked into for feasibility.

Water use by shower heads is typically the third largest source of indoor residential demand, averaging 11.6 gallons per capita per day (gpcpd) which represents approximately 17% of all indoor water use for a single-family home. The amount of water that can be saved is dependent on several variables that is specific to Canyon GID users and will need to be evaluated prior to implementation. The number of older homes with connections on the system will be one of the biggest indicators on how much water can be saved within the Canyon GID service area. Shower heads installed before the early 1980's have actual flow rates at approximately 4.3 gallons per minute (gpm) and shower heads installed between 1980 and 1994 have actual flow rates of between 1.8 to 2.7 gpm (depending on regular or low flow design.) In 1994 EPA Act required that shower heads sold, installed, or imported in the United States be low-volume fixtures that use no more than 2.5 gpm at 80 psi (rated flow rate). Actual flow rates of post 1994 shower heads indicate a water use rate of approximately 1.7 gpm. If the average shower lasts 5.3 minutes then the savings per capita for the installation of low flow shower heads are indicated in Table 1.

Shower Head Installation Timeframe	Actual Flow Rates (gpm)	Typical water usage (gallons per 5.3 minute shower)	Water Savings (gpcpd)	Water Savings (gallons per person per year)	Water Savings (gallons per household per year)
Pre-1980's	4.3	22.8	13.8	5,037	12,592
1980-1994	1.8-2.7	9.5 - 14.3	.5 - 5.3	183 - 1,934	458 - 4,835
After 1994	1.7	9.0	0	0	0

The water savings per household per year was estimated based on 2.5 persons per household. Canyon GID will need to evaluate the number of homes built before 1994 in order to estimate the amount of water that can be saved from implementing a shower head retrofit conservation program. Depending on the existing residential shower heads, Canyon GID can expect to save between 230,000 to 6,320,000 gallons per year through a successful shower head retrofit program. Canyon GID will consider the feasibility of implementing a shower head retrofitting program within its system.

Canyon GID Residential Behavioral Conservation Measures

Canyon GID will use informational measures to educate its users of individual behavioral changes that can be made to save water. A small section in the monthly newsletter will be allocated to "Water Conservation Tips" and can include amounts of water saved each year by implementing behavioral conservation measures such as turning off the water when brushing your teeth, using other methods besides allowing the water to run to cool/heat the water that comes out of the faucet, taking shorter showers, only washing clothes/dishes when the machine is full, etc. A successful educational program on behavioral changes can result in long term water savings and a financial savings to the water user.

Canyon GID Commercial/Industrial Hardware & Behavioral Conservation Measures

There are only 13 commercial/industrial connections (one with multiple meters) on the Canyon GID water system. Water conservation to these establishments can come from a variety of different methods. Canyon GID will provide educational materials to these establishments on

the importance of fixing leaking toilets/sinks. Education can result in both hardware and behavioral changes that will directly save water.

Canyon GID Water Utility Hardware & Behavioral Conservation Measures

Canyon GID will save water through the process of detecting and repairing leaks within its system. Detecting leaks within the system can be a time-consuming and costly process that may or may not result in the actual savings of a significant amount of water. Leaks within the system can contribute to high percentages of unaccounted-for water within the system. Based on historical records for pumping and water usage the amount of unaccounted-for water for Canyon GID is indicated in Table 2 below.

Year	Total Production (gal)	Total Billed (gal)	Total Unbilled Metered (gal)	Unaccounted-For (gal)	Unaccounted-For (%)
2013	52,816,000	48,353,099	63,000	4,399,901	8.3
2012	52,875,000	48,347,170	122,000	4,405,830	8.3
2011	50,776,000	46,825,060	78,000	3,872,940	7.6
2010	50,885,000	48,872,500	106,875	1,905,625	3.7
2009	53,783,000	46,508,205	895,300	6,379,495	11.9
2008	60,572,000	54,056,090	216,260	6,299,650	10.4
Average:	53,617,833	48,827,021	246,906	4,543,907	8.4

Currently, Canyon GID does not have a distribution leak detection program. Leaks in the system are detected through meter readings, monthly audits, and customer reports. As indicated in Table 2, Canyon GID has an average 8.4% unaccounted-for water. Causes for water being unaccounted-for are numerous. Leaking mains, dead meters, under-registering meters, record keeping practices, un-metered uses, and multiple users on meters all contribute to the problem. All water systems lose some amount of water and, on average, an efficient system would have 10% or less of unaccounted-for water. Calculations for Canyon GID indicate that its system is efficient with respect to unaccounted-for water percentages.

The amount of annual unaccounted-for water for Canyon GID ranges between 2,000,000 to 6,400,000 gallons. Due to the low percentage of water lost within the Canyon GID system, a leak detection program is not expected to save much additional water; however, there is value in maintaining accurate pumping and usage records in order to estimate unaccounted-for water within the system. Canyon GID will continue to detect leaks by comparing pumping and usage records to evaluate how much water is unaccounted-for annually, meter readings, monthly audits, and customer reports. If the percentages increase significantly, Canyon GID will consider the feasibility of implementing a leak detection program.

(c) The management of water to:

- (1) Identify and reduce leakage in water supplies, inaccuracies in water meters and high pressure in water supplies; and***

Canyon GID will strive to reduce the amount of water extracted from the various sources versus the water actually delivered (billed) to customers through a system of identifying and reducing leaks in the water distribution system, instituting a meter maintenance/replacement program, connecting un-metered and multiple users, monitoring water usages that are not billed for, and servicing the system valves and connections.

An audit comparing water production with metered amounts will be performed prior to implementing incentives or measures. Additional audits will then be done every year thereafter. Results from the initial audit will be compared with those of subsequent audits in order to determine the effectiveness of measures and/or incentives. Canyon GID will continue to detect leaks by comparing pumping and usage records to evaluate how much water is unaccounted-for annually, meter readings, monthly audits, and customer reports. If the percentages increase significantly, Canyon GID will consider implementing a leak detection program.

(2) Where applicable, increase the reuse of effluent.

Canyon GID currently sells 95 percent of the effluent from the Canyon GID wastewater treatment facility to the nearby landfill. The landfill uses the effluent for dust control and compaction.

(d) A contingency plan for drought conditions that ensures a supply of potable water.

The primary goal of water conservation is to insure that there is sufficient water for essential public health and safety needs at all times. The climate in Northern Nevada is arid and subject to periodic droughts that can vary in duration. It is important, therefore, to have a reserve on hand for such events. Conserving water during times of plenty will help to insure that such reserves are available for drought and emergency conditions. With recent water shortages becoming evident in other locations around the United States, maintaining an adequate supply of water is becoming a more vital component of providing the water that a community needs.

Canyon GID will maintain an adequate supply of potable water. This includes the implementation of a detailed staged contingency plan for drought conditions. Currently, Canyon GID does not have a drought contingency plan for its system. Canyon GID will draft and implement a contingency plan with staged water shortage restrictions that are applicable to its service area. This plan will be approved by the Board (include in the Tariffs) and include measures for different stages of drought. Examples of other water systems drought contingency plans that Canyon GID can use as a guide are shown in **Appendix F**.

All water supplied by Canyon GID comes from groundwater sources. Because of this it is difficult to determine the effect of a drought year on the groundwater system and the consequences of a drought may not be detected in the water table until several years after the drought. For this reason it is important that Canyon GID monitor precipitation, surface water levels, water table levels, and pumping records over the long term. An annual review of water supplies will be done to determine the availability of water for the current year and the following year. This analysis will need to be done in the spring before the high use season. In extreme instances, where a well can no longer provide the needed water, Canyon GID will consider options such as restricting water usage until the problem can be solved, increasing the depth of the existing wells, developing a new well site, and/or aggressively finding a new water source, etc. For instance, if groundwater drops to a certain level, a corresponding stage of drought

measures are then required. Canyon GID will determine how groundwater levels relate to the different stages of drought.

(e) A schedule for carrying out the plan or joint plan.

The conservation measures and incentives in this plan will be implemented according to the schedule shown in Table 3.

TABLE 3 CANYON GID CONSERVATION PLAN IMPLEMENTATION SCHEDULE			
	2014	2015	2016
<i>Measures</i>			
Shower Head Retrofit Program	Evaluate	Draft	Implement
Leak Detection Program	Monitor/Evaluate	Monitor/Evaluate	Monitor/Evaluate
<i>Incentives</i>			
Annual Production Audit	Ongoing	Ongoing	Ongoing
Monthly Consumption Audits	Ongoing	Ongoing	Ongoing
Revision to Tariffs (Rules & Regulations Landscaping Schedule, Fines/Penalties, etc.)	Ongoing	Ongoing	Ongoing
Conservation Educational Bill Inserts	Ongoing	Ongoing	Ongoing
Monthly Newsletter Conservation Tip Section	Implement	Ongoing	Ongoing
Staged Drought Contingency Plan	Draft	Implement	Ongoing
Conservation Training for Key Personnel	Ongoing	Ongoing	Ongoing

(f) Measures to evaluate the effectiveness of the plan or joint plan.

The annual production versus water usage audit will help determine if the schedule needs to be adjusted to accommodate the implementation of new measures or incentives or the discontinuation of old ones.

Based on the historical pumping records and a population estimate of 1,310 persons, Canyon GID uses approximately 130 gallons per capita per day (gpcpd). The community is predominantly residential houses with landscapes that are on automatic sprinkler systems. The automatic sprinklers are on timed schedules that make it easy for users to irrigate their lawns without running a water hose on the ground (wasting water from runoff) etc.

There has been no recorded impact from prior conservation efforts. Implementation of the plan and several years of data collection to evaluate its effectiveness will be required; however the Canyon GID is currently under the State of Nevada’s average of 200 gpcpd by 70 gpcpd. The average amount of savings per year from the State’s average is 33.5 million gallons. Water conservation efforts already in effect are indicative of this lower water use.

(g) For each conservation measure specified in the plan or joint plan, an estimate of the amount of water that will be conserved each year as a result of the adoption of the plan or joint plan, stated in terms of gallons of water per person per day.

For each conservation measure and incentive, the amount of water savings that is estimated to be conserved each year as a result of adoption of the plan is shown in Table 4. The conservation incentives for Canyon GID are described in the NRS 540.151 section of this plan. Table 4 includes a water savings for the conservation incentives based on the combination of incentives indicated in this plan.

TABLE 4 ESTIMATED ANNUAL WATER SAVINGS FROM CONSERVATION MEASURES	
	Annual Water Savings (gallons) [gpcpd]
Conservation Measures	
Shower Head Retrofit Program	(230,000 - 6,320,000) [.5-13.2]
Leak Detections (Unaccounted-For Water)	(0 - 4,400,000) [0-9.2]
Conservation Incentives	
Combined Conservation Incentive Efforts	(0 - 3,600,000) [0-7.5]
Total Estimated Future Water Savings	(230,000 - 14,320,000) [.5-29.9]
Total Existing Conservation Measures/Incentives (Based on reduction to State gpcpd)	(33,500,000) [70]
Annual Conservation Goal (5% consumption reduction)	(3,000,000) [6.3]

It is difficult to determine the actual amount of water savings that can be achieved through conservation incentives so a range is indicated based on the amount of participation within the community. Canyon GID water usage of 130 gpcpd is lower than the State of Nevada's average; however, conservation can still be obtained through an increase in the residential customers becoming further educated and continually reminded on the value of conserving water. The potential water savings based on different customer participation levels (assuming a population of 1,310 within the Canyon GID service area) are shown in Table 5 below. A range is provided for an additional savings of 10 gpcpd (reduction to 120 gpcpd) because it is difficult to determine the additional level of individual participation in educational conservation programs.

TABLE 5 RANGE OF WATER SAVINGS FROM RESIDENTIAL CONSERVATION		
% of Users Consuming 120 gallons/day	New gpcpd Average	Amount Conserved Annually (million gallons)
0	130	0
25	127	1.2
50	125	2.4
75	122	3.6
AMOUNT OF WATER ALREADY SAVED THROUGH CONSERVATION EFFORTS		
200 gpcpd	130 gpcpd	33.5

- 2. A plan or joint plan submitted for review must be accompanied by an analysis of:**
- (a) The feasibility of charging variable rates for the use of water to encourage the conservation of water.**

Canyon GID currently charges its users based on an increasing block rate schedule. The current water rates include a monthly base rate of \$43.00 (includes 15,000 gallons of water usage) and an additional \$2.00 per 1,000 gallons (from 15,000 to 20,000 gallons) and an additional \$3.50 per 1,000 gallons (above 20,000 gallons). All customers are charged the same water rate regardless of meter size or customer classification (residential, commercial, etc).

- (b) How the rates that are proposed to be charged for the use of water in the plan or joint plan will maximize water conservation, including, without limitation, an estimate of the manner in which the rates will affect consumption of water.**

Water rates, as a conservation incentive, work to increase awareness about the value of reducing water use and can motivate users to implement water conservation measures. The multiple increasing blocks/tiered rate structure (currently utilized by Canyon GID) helps to encourage its users to become more conscious of the water that is being used by increasing the cost to use higher volumes of water. The existing Canyon GID water rates have been designed to charge users for the amount of water they actually use and to encourage conservation.

- 3. The Section shall review any plan or joint plan submitted to it within 30 days after its submission and approve the plan if it is based on the climate and living conditions of the service area and complies with the requirements of this section.**
- 4. The Chief may exempt wholesale water purveyors from the provisions of this section which do not reasonably apply to wholesale supply.**
- 5. To the extent practicable, the State Engineer shall provide on his Internet website a link to the plans and joint plans that are submitted for review. In carrying out the provisions of this subsection, the State Engineer is not responsible for ensuring, and is not liable for failing to ensure, that the plans and joint plans which are provided on his Internet website are accurate and current. (Added to NRS by 1991, 521; A 2005, 2571; 2007, 1254)**

CONSERVATION INCENTIVES (NRS 540.151)

Water conservation incentives are defined as methods that motivate water users to implement conservation/efficiency measures. In itself, conservation incentives do not directly save a single drop of water; they increase the customer awareness about the value of reducing water. Increasing public awareness about the value of reducing water will lead to users making behavioral changes that will result in the increase implementation of conservation measures that directly save a quantifiable amount of water. Conservation incentives are classified into three categories: educational, financial, and regulatory. Examples of water conservation incentives are listed below:

- **Educational**
Direct-mail literature, water bill inserts, adding historical water consumption on users bills, television and radio advertisements, media coverage, school curriculum, local workshops/training programs/"Water Fairs", etc.
- **Financial**
Bill credits, rebates, conservation designed water rate structures, incentives or surcharge fees, developer rebates/compensations for water savings achieved, etc.
- **Regulatory**
Water efficiency policies/ordinances/laws/plumbing codes, landscape design standards, irrigation scheduling (allowable days of week/times of day to irrigate), penalties for outdoor water waste, pollution prevention requirements, etc.

NRS 540.151 Supplier of water required to adopt plan to provide certain incentives; procedure for adoption of plan; adoption of joint plans permitted.

1. Except as otherwise provided in subsection 5, each supplier of water which supplies water for municipal, industrial or domestic purposes shall adopt a plan to provide incentives:

(a) To encourage water conservation in its service area;

Following are specific conservation incentive methods that are used or will be utilized by Canyon GID to increase public awareness on water conservation within its service area:

- Canyon GID mails water conservation flyers (on a quarterly basis) with the monthly bill to inform Canyon GID users of the importance to conserve water. Canyon GID will continue to include conservation information (at least on a quarterly basis) in the monthly bills of its customers. These mailings should be timed with water conservation issues for the upcoming months. For instance, landscaping conservation tips should go out in the May/June months and continue throughout the summer; whereas, indoor conservation tips should go out during the months of September/October, and extreme cold weather conservation tips (contact information for frozen pipes, etc.) should go out during December/January. Included in **Appendix G** are websites that Canyon GID can utilize to obtain valuable information on water conservation tips to pass on to its users.

- Canyon GID has purchased small plastic rulers that indicate how much water can be saved by fixing leaks and handy conservation tips imprinted on them. These will be included in the monthly bill in the upcoming months. Included in **Appendix H** is a description and examples on how to read a water meter and can be included in the monthly bill to inform users on how to detect a leak on their side.
- Canyon GID sponsors water conservation booths during the “National Night Out” where the community is invited to actively participate in demonstrations. Management at Canyon GID understands the need for community involvement and education regarding water conservation and will strive to obtain funding to implement more community involvement activities.
- Canyon GID will include in its monthly newsletter a dedicate spot for water conservation tips that will encourage/educate its users about the needs to conserve water. This will include various water conservation topics/tips that are deemed pertinent to Canyon GID users.

(b) To retrofit existing structures with plumbing fixtures designed to conserve the use of water; and

Canyon GID will provide educational materials that will inform its users on the importance of water savings through the retrofitting of old plumbing fixtures. The most recent Federal and California plumbing standards are shown in Table 6. It is valuable to include California’s standards for reference since in most cases California’s requirements are more stringent. The comparison infers that there are plumbing fixtures available that exceed federal efficiency requirements and offer consumers alternatives that further improve conservation efforts. **Appendix I** lists EPA water usage benchmarks for typical residential uses.

TABLE 6 Federal and California Plumbing Standards				
Device	FEDERAL ENERGY POLICY ACT (FEPA)		CALIFORNIA	
	Manufacture	Effective Date	Sale and Installation	Effective Date
Shower Heads	2.5 gpm*	1/1/94	2.5 gpm	3/20/92
Lavatory Faucets	2.5 gpm	1/1/94	2.2 gpm	3/20/92
Sink Faucets	2.5 gpm	1/1/94	2.2 gpm	3/20/92
Metering Faucets	*	1/1/94	†	7/1/92
Tub Spout Diverters	Not included in FEPA		0.1 to 0.3 [‡]	3/20/92
Residential Toilets	1.6 gpf	1/1/94	1.6gpf	3/20/92
Flushometer Valves	1.6 gpf [§]	1/1/97	1.6 gpf	1/1/92
Commercial Toilets	1.6 gpf	1/1/97	1.6 gpf	1/1/94
Urinals	1.0 gpf	1/1/94	1.0 gpf	1/1/92

* Gallons per minute.

** 0.25 gal/cycle (pertains to maximum water delivery per cycle).

† Hot water maximum flow rate range from 0.25 to 0.75 gal/cycle and/or from 0.5 gpm to 2.5 gpm, depending on controls and hot water system.

‡ 0.1 (new), to 0.3 gpm (after 15,000 cycles of diverting).

§ Gallons per flush.

Canyon GID management has indicated that a shower head replacement program (retrofitting old shower heads that use more water for new ones supplied by the District that conserve water) is one program that is currently being looked into for feasibility. The incentive to Canyon GID users is that they would be eligible to receive free shower heads that would replace their existing shower head. It is important to carefully select a shower head that is both cost effective and will be put into use by the customer. Price should not be the main factor in the selection of the type of shower head, perception and functionality both need to be considered so that the customer does not remove the new shower head and replace it with one that uses more water.

(c) For the installation of landscaping that uses a minimal amount of water.

Canyon GID will continue to encourage the reduction of lawn sizes within its service area through education, incentives, a watering schedule of even/odd addresses, and instituting times during the day when watering is not allowed. In addition to including these rules in its Tariffs, Canyon GID has implemented a schedule of penalties/fines to enforce the violation of any water wasting within its service area.

Regulatory conservation incentives that Canyon GID has implemented include rules and regulations on outdoor water irrigation scheduling and water wasting. Canyon GID has included as a provision in its Tariffs that allowing water to run-off landscaping onto concrete/asphalt/non-vegetated areas is considered a waste of water and this action will result in warnings/penalties/fines. An odd/even watering schedule is also included in the Tariffs that will have penalties attached to users that water on the wrong days. Additionally, Canyon GID will provide brochures on Xeriscaping™ methods, types of plants that grow well in the area, and the difficulty in watering small strips/odd shaped turf, etc. to encourage its users to become more conscious about the types of plants to purchase and locations to place them.

The Canyon GID is responsible for enacting rules and regulations regarding water usage within its service area. The intent of water rules and regulations is to limit water use during water shortages and drought conditions, or to restrict use if it is found that water is being wasted. Canyon GID has a schedule of rules and regulations that define “waste of water” and include sections on enforcement through the use of citations, fines, and discontinuation of service. In addition to these, Canyon GID will draft and implement a staged drought contingency plan that will define “water shortage” and will also be approved by the Board and included within its Tariffs.

The supplier of water may request assistance from the Section to develop its plan.

2. As part of the procedure of adopting a plan, the supplier of water shall provide an opportunity for any interested person to submit written views and recommendations on the plan.

3. The supplier of water shall file a copy of the plan with the Section for informational purposes.

4. The plan:

(a) Must be available for inspection by members of the public during office hours at the offices of the supplier of water; and

(b) May be revised from time to time to reflect the changing needs and conditions of the service area. Each such revision must be made available for inspection by members of the public.

5. Suppliers of water:

(a) Who are required to adopt a plan for incentives pursuant to this section; and

(b) Whose service areas are located in a common geographical area, may adopt joint plans.(Added to NRS by 1991, 522; A 2005, 2571)

APPENDIX A – CANYON GID RESTRICTIONS/PENALTIES

CANYON GENERAL IMPROVEMENT DISTRICT WATER IRRIGATION RESTRICTIONS AND FINES

The Canyon General Improvement District, in accordance with requirements from the Division of Water Resources of the State of Nevada, has three primary restrictions regarding water used for irrigation. These restrictions are as follows:

1. Scheduled Watering Days

Odd-numbered houses may use water for irrigation on Tuesday, Thursday, and Saturday.

Even-numbered houses may use water for irrigation on Wednesday, Friday and Sunday.

Common Areas in Rainbow Bend and LCC may be watered (irrigated) on Monday, Wednesday and Friday.

MONDAY – NO watering for irrigation other than the common areas.

2. Hours Restricted From Watering

No one may use water for irrigation between the hours of 12:00 noon to 4:00 p.m. due to the fact that these are the warmest hours of the day and it is a waste of water.

3. Over Watering (water waste) defined and Not Allowed

Water waste is defined as (but not limited to) careless consumption of water as evidenced by irrigation overflowing or puddling on a property and/or flowing from property into gutters, streets, gullies, neighboring property or washes for more than 30 (thirty) minutes.

The following items may be considered exempt from Restriction #1 (Watering Days)

1. New lawns must be watered every day for a period of time. CGID management is required to audit water usage so it is necessary that a customer notify the manager that a new lawn has been put in and will require additional watering.
2. Flower and vegetable gardens may be watered more frequently if put on a drip system or watered by hand.

PENALTIES For Not Following The Water Irrigation Restrictions

First Offense – will consist of a verbal (in person or via telephone) notification by a CGID employee, LCC board member or Rainbow Bend patrol.

Second Offense – will consist of a written notification from the CGID Manager.

Third Offense – will consist of a door tag with a \$50 fine and the disconnection of water services at the main. Water services will be reinstated once the \$50 fine has been paid and the CGID Manager has been assured the customer will discontinue the misuse of water for irrigation purposes.

CANYON GENERAL IMPROVEMENT DISTRICT RESTRICTIONS AND PENALTY FOR FAILURE TO FIX LEAKS

The Canyon General Improvement District, in accordance with requirements from the Division of Water Resources of the State of Nevada, has a responsibility to ensure that customers do not use excessive water due to leaks or poorly maintained plumbing.

1. It is the responsibility of the CGID staff to audit the monthly usage of each and every customer.
2. Upon noticing unusual usage not due to normal use and irrigation, it is the responsibility of the CGID staff to investigate.
3. This investigation may consist of checking the meter and talking with the customer to determine whether habits have changed or there is a problem with the plumbing.
4. Upon discovering additional water usage due to a leak or poorly maintained plumbing, the customer will be instructed to make the necessary repairs.
5. Should the necessary repairs not be made in a timely manner (usually by the next billing period), the CGID has the responsibility and authority to disconnect the water services to the residence and not reinstate it until a \$50 fine has been paid and the repairs have been made.
6. At any time that a CGID employee discovers a meter dial spinning or observes a leak on the property of any home that is empty, it is the responsibility of the CGID to disconnect those services and not reconnect them again until a realtor, owner....someone...is present to determine where the leak might be and ensure it will be fixed. The water will then be turned back off until the repair has been made.
7. At any time a CGID employee discovers a meter dial spinning or observes a leak on the property of any home that is occupied and the customer refuses to repair the leak, it is the responsibility of the CGID to disconnect the services at the main and not restore them until the leak has been repaired and a \$50 fine has been paid.
8. Any person who turns their water back on without authorization from the CGID, will be liable for any damage incurred and may be subject to a \$50 fine for each occurrence. (Because it is illegal for a customer to turn the water back on when turned off by the utility, in certain situations, the Manager may deem it necessary to call the Storey County Sheriff.)

APPENDIX B –ORDINANCES/RULES & REGULATIONS/FINES EXAMPLES

City of Tucson Water Waste Ordinance

In June 2000, the Mayor and Council approved revisions to Tucson Code 27-15, the Water Waste Ordinance.

“It is declared that, because safe, high quality potable water and reclaimed water are a precious resources, the general welfare requires that the water resources available to the city be put to maximum beneficial use, and that the waste or unreasonable use, or unreasonable method of use, of water be prevented. For the purposes of this section, the person, corporation, or association in whose name the water utility of the city is or was last billed or who is knowingly made, causes, used, or permitted the use of water received from the city for in a manner contrary to any provision of this section.

(a) The following uses are a waste or unreasonable use or method of use of water and are prohibited:

- (1) Allowing water to escape from any premises onto public property, such as alleys or streets, or upon any other person’s property.
- (2) Allowing water to pond in any street or parking lot to a depth greater than ¼ inch or to permit water to pond over a cumulative surface area greater than 150 square feet on any street or parking lot.
- (3) Washing driveways, sidewalks, parking areas, or other impervious surface areas with an open hose, or a spray nozzle attached to an open hose, or under regular or system pressure, except when required to eliminate conditions that threaten public health, safety or welfare. This restriction does not apply to residential customers.
- (4) Operating a misting system in unoccupied non-residential areas.
- (5) Operating a permanently installed irrigation system with a broken head or emitter, or with a head that is spraying more than 10 percent of the spray onto the street, parking lot, or sidewalk; this prohibition does not apply unless the head or emitter was designed to deliver more than one gallon of water per hour during normal use.
- (6) Failing to repair a controllable leak, including a broken sprinkler head, a leaking valve, or a leaking faucet.

(b) Any person who violates any portion of this section is guilty of a civil infraction, and shall be fined upon the first offense, a minimum of two hundred fifty dollars (\$250); and upon the second offense within a period of three (3) years and upon each subsequent conviction within such period, a minimum of five hundred dollars (\$500). The imposition of civil liability shall not preclude the city from taking any other enforcement actions permitted under section 27-14 or section 27-97 of this chapter.”

For more information about the Water Waste Ordinance, call 791-4331

To report incidents of water waste, call Tucson Water at 791-3242. Water Waste Ordinance 042707

CITY OF TUCSON WATER WASTE ORDINANCE

In June 2000, the Mayor and Council approved revisions to Tucson Code 27-15, the Water Waste Ordinance, which prohibit the following activities:

1. Allowing water to escape from any premises onto public property, such as alleys or streets, or upon any other person's property.
2. Allowing water to pond in any street or parking lot to a depth greater than 1/4 inch or to permit water to pond over a cumulative surface area greater than 150 square feet on any street or parking lot.
3. Washing driveways, sidewalks, parking areas, or other impervious surface areas with an open hose, or a spray nozzle attached to an open hose, or under regular or system pressure, except when required to eliminate conditions that threaten public health, safety or welfare. This restriction does not apply to residential customers.
4. Operating a misting system in unoccupied non-residential areas.
5. Operating a permanently installed irrigation system with a broken head or emitter, or with a head that is spraying more than 10 percent of the spray onto the street, parking lot, or sidewalk. This prohibition does not apply unless the head or emitter was designed to deliver more than one gallon of water per hour during normal use.
6. Failing to repair a controllable leak, including a broken sprinkler head, a leaking valve, or a leaking faucet.

TIPS TO REDUCE WATER WASTE

Irrigation System

- Regularly check irrigation systems for leaks, overspray, pressure, damaged or broken sprinklers (heads, pipes, emitters, tilted heads, and valves).
- Install rain, relative humidity, or evapotranspiration (ET) sensors on timers.
- Adjust irrigation run times to meet plant demands:
 - Over-watering causes most water waste violations.
 - Know how much time you can run each valve before water runoff occurs.
 - On slopes, reduce run time to eliminate runoff and add another start time (if necessary).
 - Improve Distribution Uniformity (DU) – the measurement of how evenly the water is distributed over the irrigated area. Poor uniformity results in higher water use & over-watering to reach the under-irrigated areas (brown spots).
- Check spacing of sprinklers based on DU.
- Replace sprinkler heads so they are uniform by type (rotors, spray) and brand.
- Insist on SmartScape trained professionals.

MORE TIPS TO REDUCE WATER WASTE

Design

- Consider reducing overall turf area.
- Eliminate small and irregular size turf areas (less than 5' width).
- Eliminate turf adjacent to hardscape (sidewalks, streets, parking lots).
- Make sure turf areas are lower than hardscapes.
- Make sure plants are planted by hydrozone (desert-adapted plants together, high water use plants together) and are being watered correctly.

CITY OF TUCSON

WATER WASTE

VIOLATION

ENFORCEMENT

PROCESS

For more information
about the
Water Waste Ordinance,
call 791-4331



Si usted desea este en español,
llame al 791-4331.

City of Tucson TTY# 791-2639

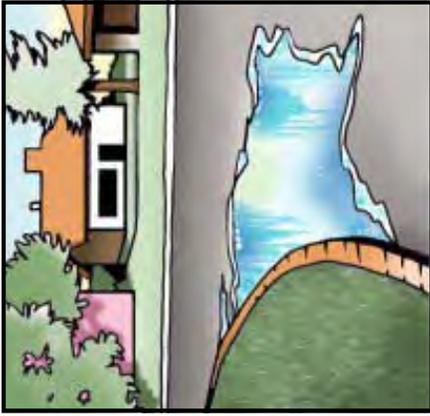
Visit our website:
www.tucsonaz.gov/water/

PIO-7-07

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WATER WASTE ENFORCEMENT PROCESS



Step 2. Conduct an Audit

If the irrigation system has multiple problems, Tucson Water strongly recommends a formal landscape irrigation audit be conducted. Audits should include the following information:

- A checklist for each valve or station (“Station Data” form).
- A measurement of distribution uniformity for representative zones, or zones where visual inspection indicates a potential problem.
- An estimate of the irrigation efficiency in each zone.
- Current and recommended irrigation schedule & suggested improvements.

A complete report from the auditor should be filed with Tucson Water.

Step 3. Develop an Action Plan

- Create a list of priority water management actions by considering those that are: 1. no-cost, 2. low-cost, and 3. actions that require money

Upon investigation of a Water Waste complaint, **Tucson Water may issue a citation immediately** upon observing a violation of the Water Waste Ordinance (see reverse). Within three days, Tucson Water will verify that the problem has been corrected.

Step 1. After Initial Investigation by Tucson Water Staff

Immediately stop the source of water waste. If the water waste continues after the first warning, a citation can be given at any time. Efforts should be made to correct any problems identified during the initial investigation (i.e. replace broken sprinkler heads, repair leaks, irrigation timer(s) adjust or turn off, schedule audit).

Citation Process

When a violation is observed, a written notice requiring the violation to be corrected will be given to the customer. A citation can be issued at this time or the responsible party may be given time to correct the problem. If the violation is not corrected within the specified time, a citation will be issued and a fine in the amount of \$250 may be imposed for a first time offense. Subsequent violations are subject to a minimum fine of \$500 and a maximum fine of \$2,500.

Despite the availability of penalties, the main effort of the Water Waste Enforcement program is educational, even after a citation has been issued. The money used to pay a fine would be much more effectively spent improving water use efficiency and eliminating waste. To that end, Tucson Water seeks fines primarily in cases where repeated water waste is occurring, where property owners or managers are unwilling to make necessary improvements, or where violations are intentional.

(“Water Conservation Actions – Costs & Benefits” form).

- Develop a plan that outlines the actions and implementation schedule (“Irrigation System Audit Budget Worksheet”).

Step 4. Prepare for Follow-up by Tucson Water Staff

Three days after the initial investigation, Tucson Water Conservation Inspectors will revisit the site, investigate the problem areas, and review any repairs and changes.

Step 5. Citation

If corrections have not been made or audit/repair dates have not been scheduled, a citation will be issued for each offense and for each day that the violation continues. It is possible that a business could receive more than one citation per day for different violations (i.e. water escaping onto street & pooling to 1/4” in parking lot).

Find a qualified auditor and audit forms at:
www.tucsonaz.gov/water/conservation.htm

**Indian Hills General Improvement District
WATER USE RESTRICTION ORDINANCE NO. 001**

Summary of Ordinance: An ordinance incorporating herein water use limitations relating to a water conservation plan; defining terms re: water use limitations, declaration of shortage together with other matters properly relating thereto.

TITLE

AN ORDINANCE INCORPORATING WATER USE RESTRICTIONS IN THE INDIAN HILLS GENERAL IMPROVEMENT DISTRICT, PROVIDING FOR DEFINITIONS AND PENALTIES: DECLARATION OF WATER SHORTAGE; INCORPORATING WATER RATES PROVIDED WITHIN AND OUTSIDE THE BOUNDARIES OF THE IHGID GENERAL IMPROVEMENT DISTRICT; TOGETHER WITH OTHER MATTERS PROPERLY RELATING THERETO.

THE BOARD OF TRUSTEES OF THE IHGID GENERAL IMPROVEMENT DISTRICT DOES ORDAIN:

Section 1: *Declaration of Purpose:*

1. The Board of Trustees of the District recognizes the importance and appropriateness of conserving domestic water, which purpose requires the imposition of certain restrictions on use in certain circumstances in order to prevent unnecessary use or waste.
2. In order to assure that the District can provide adequate supplies of water to its citizens, the Board of Trustees may, after a declaration of water shortage is made as provided herein, additionally restrict the use of water for certain irrigation or household purposes, and/or limit the time within which water may be used for those purposes. In furtherance of that goal, the Board enacts this ordinance pursuant to its authority granted by NRS 318.170.

Section 2: *Definitions:*

As used in this ordinance the following words or phrases are defined as follows:

1. "**Board**" means the Board of Trustees of the IHGID General Improvement District.
2. "**Declaration**" means the declaration of water shortage by the Board when it appears to a majority of the Board that either insufficient water is available to meet the reasonable needs and requirements of the District, or that there is insufficient potable water for human consumption as determined by the Nevada State Health Department or the Douglas County Health Officer.
3. "**District**" means the IHGID General Improvement District.
4. "**District Agent**" means the District manager, engineer maintenance supervisor, or Board member.
5. "**Household Purposes**" means the purposes for which a person uses water inside a residence, and excluding all outside irrigation uses.
6. "**Irrigate**" means, but is not limited to, irrigate, water, moisten, sprinkle, soak, waterlog, flow, wet or any supply of water to land by natural or artificial means for other than household purposes.

**IHGID General Improvement District
WATER USE RESTRICTION ORDINANCE NO. 001**

7. "**User**" means, but is not limited to, the record owner of the property or location as such owner is defined by the records of the Douglas County Assessor, or a tenant residing at such location.

8. "**Water Waste**" means, but is not limited to; violation of the water use restrictions, or the careless consumption of water as evidenced by irrigation overflowing or puddling on a property and/or flowing from property into gutters, streets, gullies, neighboring property or washes for more than 30 (thirty) minutes.

Section 3: Water Use Restrictions in the event of a Declaration of water shortage:

1. Upon declaration by the Chairman of the Board, after a majority vote of the Board, taken at a regularly held meeting, at a specially called meeting or after a telephone canvass of Board members by the District agent, the Board may impose any or all of the following restrictions:

- A. Require that irrigation be conducted only as may be permitted by the decision of the Board at the time of the Declaration of Shortage.
- B. Prohibit the use of water for other than household purposes.

Section 4: Non-emergency Restrictions:

- 1. Without declarations by the Board of a water shortage, and continuously in effect, in no event shall a water user irrigate or use water for other than household purposes between the hours of 12:00 noon to 4:00 p.m.
- 2. In no event shall a water user waste water in violation of this ordinance as water uses are defined in Section 2 herein.
- 3. In no event shall a water user irrigate during high-wind periods, defined as continuous winds in excess of an average speed of 15 miles per hour.

Section 5: Exemptions:

- 1. The Board may exempt the following uses of water:
 - A. Lawns which have been planted within thirty (30) days of the date restrictions are imposed.
 - B. Professional gardeners or landscapers when performing professional services.
 - C. Flower and vegetable gardens

Section 6: Penalties:

1. Any user found by the agent of the District to be in violation of this ordinance, may, in addition to being subject to all rights and remedies of the District at law, be subject to the following:

During one watering season:

- A. **First violation:** A user found to be in violation of these provisions shall be warned by the District agent, orally or in writing.
- B. **Second violation:** A user found to be in violation of these provisions on a second occasion shall be warned by certified mail or served in person by the District agent.

**IHGID General Improvement District
WATER USE RESTRICTION ORDINANCE NO. 001**

C. **Succeeding violation:** A user found to be in further violations of these provisions shall have water service discontinued and a fine of \$50.00 (fifty dollars) shall be assessed. The water service shall be resumed upon receipt of the \$50.00 fee.

D. Each and every day of violation of this ordinance is deemed to be a separate and succeeding violation.

2. Nothing contained herein shall prevent the District agent, without notice to any resident, from entering a property and halting water waste, or, if the entrance to the property is not possible, from causing water service to the property to be halted.

3. It is the intention of the Board of Trustees of the IHGID General Improvement District that any and all penalties delineated herein shall be paid by the user in violation.

Section 7: Appeals:

1. Any person aggrieved by the actions of the District agent in the enforcement of this ordinance, may appeal such action to the Board.

2. An appeal may be taken within ten days after written notice of the action of the agent of the District by paying to the District the fee of \$25.00 (twenty-five dollars), in addition to any fee or penalty assessed pursuant to this ordinance, and filing a written statement of the reasons why the action of the agent of the District is in error.

3. The Board shall hear the appeal within forty-five (45) days after the filing of the statement of the reasons. The Board shall give the appellant three (3) days written notice of the date, time and place of the hearing.

4. Any person who fails to file a written statement with the District within three (3) days after notice of the action of the agent of the District waives his right to appeal.

5. Upon a person's failure to timely file for appeal, or upon final action by the Board with respect to an appeal, the Board may pursue any of its rights and remedies contained at law or in this ordinance.

Section 8: Severability:

1. It is declared to be the intention of the District that the sections, paragraphs, sentences, clauses and phrases of this code are severable, and if any phrase, clause, sentence, paragraph, or section of this code is declared unconstitutional or invalid by the valid and final judgment or decree of a court of competent jurisdiction, such unconstitutionality or invalidity shall not affect any of the remaining phrases, clauses, sentences, paragraphs and sections of this code.



Water Conservation Ordinance

El Paso Municipal Code: Title 15 PUBLIC SERVICES, Chapter 15.13 WATER CONSERVATION

The Water Conservation Ordinance, which applies to any person who uses water from the El Paso Water Utilities supply system, contains mandatory year-round restrictions on certain water use activities and prohibits water waste.

- **Landscape Watering Days:** There is no residential watering on Mondays; however, customers of El Paso Water Utilities can water their landscapes three days a week, year-round as follows:
 - EVEN numbered addresses are allowed to water Tuesdays, Thursdays, and Saturdays.
 - ODD numbered addresses are allowed to water Wednesdays, Fridays, and Sundays.
 - Schools, parks, cemeteries, golf courses and industrial sites are allowed to water Mondays, Wednesdays, and Fridays.
- **Times Restrictions:** From April 1 through September 30, outdoor watering is only permitted before 10:00 a.m. or after 6:00 p.m. on designated EVEN or ODD days.

Variations: If a customer desires a change in irrigation days and hours, it is the customer's responsibility to apply for a variance and demonstrate hardship By contacting the Water Conservation Department at (915) 594-5508. A Review Board can modify established schedules or approve requests for variances. Variances are based on the Review Board's recommendations and are usually granted to customers that, because of age or health, depend on someone else to do yard work, or for those out-dated irrigation systems that can't irrigate within the allotted time. All variances are discontinued during water emergencies and drought Stages 2 and 3.

Permits:

- Landscape Watering Permits are granted for a 30-day period for establishment of new lawns.
- One-day permits are granted for the application of either chemicals or fertilizer.

These permits allow the customer to water as needed; however, water is never to be allowed to run into the street. It is the customer's responsibility to call the Water Conservation Department at (915) 594-5508 to request permits.

Landscape permits and chemical permits will be limited when drought restrictions are in effect.

Car washing: Residential Car washing is only allowed if a bucket and/or a hand-held hose equipped with a positive shut-off nozzle is used. During a water emergency or during Stage 3 drought restrictions, washing of vehicles will only be permitted at commercial establishments equipped with treatment and recycling systems and approved by the El Paso Water Utilities. Fundraising Car washing events can only be held at commercial car wash establishments.

The following uses of water are defined as "wasting water" and are prohibited:

- Landscape watering on the wrong day and/or wrong time
- Allowing water to flow into public right of way or storm water drainage system.
- Failure to repair a leak within five working days of the discovery of the same.

Washing down impervious surfaces, except in emergencies to remove spills of hazardous materials or eliminate dangerous conditions.

Issuance of citations: Violations to this ordinance can result in a Class C misdemeanor citation. Fines can range from \$50 to \$500 per citation.



Stage 1

Stage 1 is used to prepare El Pasoans for an impending drought. EPWU will inform customers of the conditions and ask for a voluntary reduction in water usage.

Stage 1 response options are:

1. A voluntary reduction goal of 25 percent in indoor and outdoor water use.
2. Increased public education.
3. Restaurants are requested to voluntarily discontinue serving water except upon request.
4. Hotels and motels are urged to implement water conservation measures, including the reduction of laundry water usage.
5. Manufacturing industries using water provided by El Paso Water Utilities are urged to decrease water consumption by 25 percent.
6. All private well operators are urged to reduce water use by 25 percent.
7. All other area water purveyors are requested to comply voluntarily with all drought management response measures. However, if wholesale water service contracts with these purveyors include specific drought or water emergency language, the contract supersedes this Drought and Water Emergency Management Response Plan.
8. The General Manager shall authorize additional personnel to issue citations for violations of the Water Conservation Ordinance and the Drought and Water Emergency Management Response Plan, consistent with Civil Service rules.

Any of the above measures may be implemented as warranted.

Stage 2

All Stage 1 response options remain in effect. Additionally:

1. Outdoor watering will be limited to once per week as per the following schedule. Watering will occur before 9:00 a.m. and after 7:00 p.m. and shall be limited to two hours per day. The last number of the street address shall determine watering days.

Watering Schedule:

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Last # of address	-	0	1,3	2,4	5	6,8	7,9

(Outdoor watering performed with a permanent drip irrigation system, sub-surface irrigation, or reclaimed water is exempt. Using a bucket to water trees, shrubs and flowers is permitted. Using household greywater is encouraged.)

2. Parks and schools served by El Paso Water Utilities shall water in accordance with a special permit issued by El Paso Water Utilities and will reduce consumption by a specific amount per month based on reduction targets set by EPWU to meet basic demand. (Parks and schools irrigating with reclaimed water are exempt.)
3. Golf courses irrigating with potable water supplied by El Paso Water Utilities and municipal golf courses shall water in accordance with a special permit and will reduce consumption by a specific amount per month based on reduction targets set to meet basic demand. (Golf courses irrigating with reclaimed water are exempt.)
4. Water used to provide for the health, safety and welfare of the El Paso Zoo animals is not subject to the water emergency responses listed herein. Zoo water requirements will be as determined by the Zoo Director.
5. Nurseries shall water plant stock in accordance with a special permit issued by El Paso Water Utilities.
6. No new landscaping shall be installed or planted and no new landscape watering permits will be issued except for Xeriscapes which are drip irrigated using a permanent system, use subsurface irrigation, or are irrigated with reclaimed water. New landscaping watering permits shall be granted for a 7-day period for landscaping that incorporates compost in the area at a rate of 5 cubic yards per 1000 square feet of turf.
7. All evaporative cooler continuous bleed-off lines shall be restricted or replaced with an automatic water drainage system.
8. All water conservation ordinance variances are automatically suspended and no new variances will be issued.
9. Routine fire hydrant flushing and testing shall be curtailed.
10. Existing swimming pools cannot be filled with potable water supplied by El Paso Water Utilities after April 1. Single-family residential swimming pools must be covered when not in use. Pools can be topped off to replace water loss by evaporation.
11. Upon a second violation of the Drought and Water Emergency Management Response Plan, the General Manager may order the installation of

a restriction device or downsizing of the water meter at the customer's cost.

12. Restaurants shall serve water only on request.
13. Misters shall not be operated, except by special permit for health and safety reasons.
14. Water can be used for aesthetic purposes, such as ornamental fountains, in accordance with a special permit issued by El Paso Water Utilities.
15. Impervious surface cleaning with potable water shall be prohibited, except where conducted by order of the City-County Health and Environmental District or the Police and/or Fire Department.
16. Hotels and motels must implement water conservation measures, including the reduction of laundry water usage.
17. A drought surcharge may be added to water rates.
18. Large housing complexes shall be allowed additional time to water on their designated day, on a case-by-case basis by permit, to be approved by the El Paso Water Utilities Water Conservation Department.

Stage 3

All Stage 1 and 2 drought management response options shall remain in effect.

Additionally:

1. All outdoor watering is prohibited, except when performed with a bucket or permanent drip irrigation system, subsurface irrigation, or where reclaimed water is used.
2. The irrigation of golf courses with potable water supplied by El Paso Water Utilities and the irrigation of municipal golf courses is prohibited.
3. All car, trailer, truck, or boat washing is prohibited, except in facilities certified by El Paso Water Utilities and displaying approved signage.
4. No swimming pools shall be filled.
5. All water use for construction, dust control and/or compaction is prohibited, except with reclaimed water or brackish groundwater.
6. New water meters shall be approved for connection to the water system only as required for military expansion and/or high priority economic development projects, as determined by the General Manager and the Public Service Board.
7. All street sweeping shall be discontinued, except that performed with reclaimed or brackish groundwater.



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Watering Regulations and Restrictions

Municipal Code Section 14-119

Water use regulations and restrictions are conditions of service which are in effect year round; apply to all customers served water by the City of Fresno and are subject to change at any time.

Phone (559) 621-5480 for questions regarding these regulations and restrictions.

[Click here for: Water Waste Reporting form](#)

CITY OF FRESNO OUTDOOR WATERING SCHEDULE

WINTER WATERING SCHEDULE
DECEMBER 1 – MARCH 1

<p>SATURDAY ONLY ODD NUMBERED ADDRESSES (ending in 1, 3, 5, 7, 9)</p>	<p>SUNDAY ONLY EVEN NUMBERED ADDRESSES (ending in 0, 2, 4, 6, 8)</p>
<p>WATERING TIMES: ANYTIME ON YOUR WATERING DAY</p>	

SUMMER WATERING SCHEDULE
MARCH 2 – NOVEMBER 30

<p>TUESDAY, THURSDAY & SATURDAY ODD NUMBERED ADDRESS (ending in 1, 3, 5, 7, 9)</p>	<p>WEDNESDAY, FRIDAY & SUNDAY EVEN NUMBERED ADDRESSES (ending in 0, 2, 4, 6, 8)</p>
<p>WATERING TIMES: 8 AM TO 11 AM – 7 PM TO 6 AM</p>	
<p>NO WATERING ON MONDAYS NO WATERING BETWEEN: 6 AM TO 8 AM & 11AM TO 7 PM</p>	

Turf, Lawn

The installation of blue grass is prohibited. Bluegrass is a cool season, water

WEATHER

62

A Few Clouds

10-Day Forecast
Traffic Conditions
Burn Day Status

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Solid Waste	intensive turf not suited to our semi-arid climate. It uses substantially more water than other grasses planted in our area. Until its prohibition, it was the turf of choice in many new developments in our community.
Water Division	
Conservation	
Best Management Practices	Lawns and landscapes represent an estimated 54% of the residential demand for water in Fresno. Prohibition of the installation of new bluegrass lawns can reduce the demand for water for the irrigation of turf by up to one third in new developments.
Community Education Outreach	
Water Customer Service	Bluegrass uses 1.46" of water per week in June compared to .95" of water for a warm season grass such as Bermuda. It also uses more water than general cool season grass varieties. Source: Center for Irrigation Technology, California State University, Fresno .
Water Efficient Landscaping	
Water Regulation & Permits Overview	
Watering Regulations & Restrictions	Bermuda grass goes dormant during the winter and requires no watering.
Distribution	
Groundwater Recharge	
Production	
SCADA System & Information Control	
Surface Water Treatment Facility	
Water Information	
Water Quality	
Online Forms & Permits	
FAQs	
Water Division Contact Information	
Wastewater Management	
FAQs	
Public Works	
Services Directory	
eGov Services	
Fresno ADA Advisory Council	
One Call Center	
	<p>Outdoor Water Use</p> <p>Unattended, open hose (without automatic shut off device), faucet, or sprinkling device is prohibited.</p> <p>Leaking, broken or improperly maintained water connections, hoses, sprinklers, faucets, hydrant, pipes, outlets, or plumbing fixtures are prohibited.</p> <p>Flooding streets, drains, gutters, property, etc. is prohibited.</p> <p>Flooding or sprinkling of the premises of another and/or causing damage or deterioration of property is prohibited.</p> <p>Washing or rinsing privately owned vehicles (e.g., autos, truck, trailers, boats, etc.) Without a shut-off nozzle on hose is prohibited.</p> <p>Washing or rinsing with a hose or watering device of any sidewalk, driveway, parking area, tennis court, patio, or any other exterior paved area, except in a way that prevents the bulk of the run-off water from entering the street and instead diverts such water to other productive purposes such as landscape irrigation, is prohibited.</p> <p>Lawn sprinkling system/devices shall be properly designed, installed, maintained, operated to prevent wastage of water.</p> <p>Installing or replacing air-conditioning system (including portables) without a water conservation device which is properly maintained is prohibited.</p> <p>Proprietary Fees for Water Wastage Incidents</p> <p>Notice #1 = First water incident - \$45.00 deferred (see Notice #4).</p> <p>Notice #2 = \$45.00 deferred to Notice #3 if customer accepts the option of attending a free water conservation class.</p> <p>Notice #3 = \$45.00 and previously deferred \$45.00 fee from Notice #2. <i>Customers shall have the option of submitting proof of implementation of retrofit measures of no less value than the fee imposed for such third incident of water wastage in lieu of the fee. Retrofit measures of a value less than that fee shall be credited toward payment of the fee.</i></p> <p>Notice #4 = \$45.00 and previously deferred \$45.00 fee from Notice #1.</p> <p>Receiving more than four incident Notices within a two year period may result in the City implementing any or all of the following measures:</p> <p>A. Charge \$45.00 per water waste incident.</p>

- B. Require a professional landscape evaluation and water audit at the owners expense.
- C. Repair the water system at the owners expense.
- D. Restrict or terminate water service.

All applicable fees will be added to the customer's utility bill.

NOTE: Section 14-137 Water Representatives shall, at all reasonable times have the right to ingress and egress from a customer's property.

Incident of Water Wastage Appeal Process

Step 1 If a customer objects to his/her incident of water wastage notice, he may call the Water Conservation Program at 621-5480 in order to discuss the incident with the inspector who issued the notice.

This issuing inspector has no authority to rescind incident notices. However, upon being contacted by the customer, the inspector shall gather the facts about the incident and explain them to the Water Conservation Supervisor, who may decide whether or not to rescind the notice.

Step 2 If the customer is not satisfied with the decision of the Water Conservation Supervisor, he/she may appeal to the Water Systems Manager who shall review such appeal and render a written decision within thirty days of such appeal.

Step 3 If the customer is not satisfied with the decision of the water Systems Manager he/she may appeal to the Director of Public Utilities who shall review such appeal and render a written decision thirty days after receiving such an appeal.

Step 4 The customer may make a final appeal directly to the City Council if still not satisfied. The appeal listed in Step 2 above shall be filed in writing within thirty days of the date of the utility billing on which the fee for the water wastage charge has been imposed. Each subsequent appeal shall be filed in writing within 30 days from the date of the written decision being appealed.



English



Français



Deutsch



Italiano



Português



Español



Русский



Nederlands



Ελληνικά



日本語



한국어



简体中文



繁體中文



LYON COUNTY UTILITIES WATERING SCHEDULE

❖ Odd / Even Watering (June 1 through October 1)

- Even numbered addresses water on even numbered calendar days
- Odd numbered addresses water on odd numbered calendar days
- No watering on the 31st of any month

❖ Do Not Water

- Between 10:00am – 6:00pm (heat of the day)
- During windy periods
- On rainy days

❖ Tips

- Do not over-water lawn
- Adjust sprinklers to avoid over-spray and run-off
- Water during the coolest part of the day
- Check and maintain proper sprinkler timer settings
- Consult with a landscape professional on how to maintain a healthy landscape
- Promptly repair even the smallest leaks
- Replace old household plumbing fixtures with low-flow fixtures
- Contact Lyon County Utilities for a list of allowable exemptions to the watering schedule.

- ❖ Violators of the Odd/Even schedule or people that waste water are subject to written warnings followed by fee assessments which are based on the number of violations in a calendar year.

If you have any questions, call Lyon County Utilities at 246 – 6220.

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WATER WASTE ORDINANCE**

Section 4. WATER WASTE ORDINANCE

4-1-1. SHORT TITLE.

This article shall be known as the "Water Waste Ordinance."

4-1-2. INTENT.

(A) To assist in reducing overall per capita water use by 40%.

(B) To reduce yard irrigation and irrigation-related water waste, which comprise over 40% of the total annual water usage. To reduce peak summer usage, which is two to three times winter usage and determines the need for capital facilities to adequately meet system demand.

(C) To reduce water waste; i.e., overwatering, inefficient watering, or release of water which generates fugitive water in the public right-of-way. To reduce damage to publicly owned streets and the public expenditures necessary to repair the damage caused by this wasted water. To increase street safety by reducing the potential of frozen water on public right-of-way.

(D) To acknowledge that water conservation is easier to accomplish, both financially and practically, in the design and construction of new buildings than it is through the retrofitting of existing buildings and that new construction should therefore be held to a higher conservation standard.

4-1-3. DEFINITIONS.

For the purpose of this article, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

AUTHORITY. The Albuquerque Bernalillo County Water Utility Authority or its authorized agent. It includes the water and wastewater facilities and all operations and management of such facilities necessary to provide water and wastewater service in the Service Area.

BUBBLERS. Irrigation heads which deliver water directly to the soil adjacent to the heads.

CURBSIDE CAR WASHING. Car washing near a public right-of-way, hose sweeping, charity or fundraiser car washes, car washing on dealer lots.

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CUSTOMER. Any person, association, corporation or other entity receiving Authority service.

DRIP IRRIGATION. Low pressure, low volume irrigation applied slowly, near or at ground level to minimize runoff and loss to evaporation.

DROUGHT. Drought occurs when there is insufficient precipitation combined with other environmental factors that cause an increase of overall water usage.

DROUGHT MANAGEMENT STRATEGY. The Authority's Drought Management Plan which contains four different drought severity levels.

EXECUTIVE DIRECTOR. The Executive Director of the Authority or his/her designee.

FUGITIVE WATER. The pumping, flow, release, escape, or leakage of any water from any pipe, valve, faucet, connection, diversion, well, or any facility for the purposes of water supply, transport, storage, disposal, recreational, cleaning process or delivery onto adjacent property or the public right-of-way.

HAND WATERING. The application of water for irrigation purposes through a hand-held hose.

INFILTRATION RATE. The amount of water absorbed by the soil per unit of time, usually expressed in inches per hour.

INSPECTION. An entry into and examination of premises for the purpose of ascertaining the existence or nonexistence of violations of this article.

INTER-SEEDED. Seeding of an area within an existing turf area to repair damage. This type of process is also known as re-seeding.

MISTER. A device that produces a cooling effect by emitting fine particles of water into the air in the form of a mist.

NEW CONSTRUCTION. Any new residential or commercial building.

NEW CUSTOMER. Any person, association, corporation or other entity obtaining Authority service for New Construction.

NEWLY SEEDED. Seed planted in a barren area with the intent of establishing a turf area.

PUBLIC RIGHT-OF-WAY. The area of land acquired or obtained by the city, county, or state primarily for the use of the public for the movement of people, goods, vehicles, or

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storm water. For the purposes of this article the public right-of-way shall include sidewalks, curbs, streets, and storm water drainage inlets.

RESPONSIBLE PARTY. The owner, manager, supervisor, or person who receives the water bill, or person in charge of the property, facility, or operation during the period of time the violation(s) is observed.

RUNOFF. Water which is not absorbed by the soil or landscape to which it is applied. Runoff occurs when water is applied too quickly (application rate exceeds infiltration rate), particularly if there is a severe slope. This article does not apply to stormwater runoff which is created by natural precipitation rather than human-caused or applied water use.

SERVICE AREA. All areas that are served or may be served in the future by the Authority.

SHUT-OFF NOZZLE. Device attached to end of hose that completely shuts off the flow of water.

SPRAY IRRIGATION. The application of water to landscaping by means of a device that projects water through the air in the form of small particles or droplets.

VALVE. A device used to control the flow of water in the irrigation system.

WATER WASTE. The nonbeneficial use of water. Nonbeneficial uses include but are not restricted to:

(1) Landscape water applied in such a manner, rate and/or quantity that it overflows the landscaped area being watered and runs onto adjacent property or public right-of-way;

(2) Landscape water which leaves a sprinkler, sprinkler system, or other application device in such a manner or direction as to spray onto adjacent property or public right-of-way;

(3) Washing of vehicles, equipment, or hard surfaces such as parking lots, aprons, pads, driveways, or other surfaced areas when water is applied in sufficient quantity to flow from that surface onto adjacent property or the public right-of-way;

(4) Water applied in sufficient quantity to cause ponding on impervious surfaces.

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4-1-4. WATERING RESTRICTIONS.

These restrictions apply to all customers within the Authority's service area.

(A) All spray irrigation during the period beginning on April 1 and ending on October 31 of each year must occur between 7:00 p.m. and 11:00 a.m. This restriction shall not apply to drip irrigation and low precipitation bubblers, hand watering, or watering of containerized plants and plant stock.

(B) All spray irrigation during the months of November 1 through March 31 must occur between 10:00 a.m. and 2:00 p.m. This restriction shall not apply to drip irrigation and low precipitation bubblers, hand watering, or watering containerized plants and plant stock. This restriction shall not apply to golf courses or parks that are in regular use or in use for a special event during these hours.

(C) Shutoff nozzles are required on any hoses used for hand watering, car washing or other outdoor uses.

(D) Restrictions in divisions (A) and (B) above do not apply to the following:

(1) Outdoor irrigation necessary for the establishment of newly sodded lawns and landscaping within the first 30 days of planting upon the issuance of a Watering Restriction Exemption;

(2) Outdoor irrigation necessary for the establishment of newly seeded lawns within the first 120 days of planting upon the issuance of a Watering Restriction Exemption.

(3) Outdoor irrigation necessary for the establishment of inter-seeded lawns within the first 45 days of planting upon the issuance of a Watering Restriction Exemption.

(4) Irrigation necessary for one day only where treatment with an application of chemicals requires immediate watering to preserve an existing landscape or to establish a new landscape;

(5) Water used to control dust or compact soil;

(6) Attended watering systems that have one or more repair or maintenance personnel present at the irrigated zone being serviced for purposes of

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inspecting system condition and function and/or repairing or maintaining the watering system.

4-1-5. WATER CONSERVATION REQUIREMENTS FOR NEW CONSTRUCTION.

These restrictions apply to new customers within the Authority's service area. Service shall not be provided to new customers if the new construction does not meet the following requirements. If after service is provided it is determined that a violation exists, including a change to the new construction that would have been a violation as of the date that service was first provided, the customer shall be subject to those fees set out in the penalty provisions of § 4-1-99. A variance may be granted pursuant to the provisions of this ordinance.

(A) New customers shall provide evidence, in a form acceptable to the Executive Director, that the new residential construction is designed so as to be able to achieve a maximum water use of 180 gallons per household per day.

(B) At a minimum, in order to meet 180 gallons per household per day standard a new customer occupying new residential construction shall meet the following requirements. New non-residential construction shall meet the same requirements.

(1) Toilets shall all meet the standards of being high-efficiency toilets (HETs) as defined by the Environmental Protection Agency Water Sense program.

(2) Evaporative coolers shall be recirculating and shall have low voltage thermostats and two-speed blowers. No evaporative coolers may be installed that require a continuous "bleed -off " water line.

(3) Non-native grass shall not be installed:

a) on slopes greater than 5:1

b) in areas smaller than 10 feet in any dimension that is spray irrigated.

(4) There shall be compliance with all applicable water conservation landscaping ordinances, rules and regulations of any local governmental body, municipality or county, in which the construction is located.

(C) Any new construction of multi-family dwelling units, manufactured home rental community, mobile home parks and condominiums must provide for submetering

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of each dwelling unit or rental unit for the measurement of the quantity of water consumed by future occupants of such units as of the date of enactment of this Ordinance. The property owner must issue a monthly water bill to each individual residence unit showing their water usage that month and billing them based upon their actual water usage. Bill must include beginning and ending meter readings for the individual residence unit being billed.

Compliance with this provision is mandatory. Failure to comply with this provision shall subject the property owner to the penalty provisions of 4-1-99.+]

(D) All new construction shall provide for the capture of drainage from a minimum of 85% of the roofed area.

(1) New construction of 2,500 sq. ft. of heated area or greater shall install a cistern that is buried and is connected to a pump and a drip irrigation system to serve landscaped areas. Cisterns shall be sized to hold 1 gallon per square foot of roof area but this figure may be adjusted based on proposed landscaping. The capacity of the cistern shall be approved by the Executive Director.

(2) New construction smaller than 2,500 sq.ft. of heated area shall install rain barrels, cisterns or other water catchment basins.

4-1-6. WATER WASTE.

These restrictions apply to all customers within the Authority's service area.

(A) No person, firm, corporation, or municipal or other government facility or operation shall waste, cause or permit any water to be wasted.

(B) No person, firm, corporation, or municipal or other government facility or operation shall cause or permit the flow of fugitive water onto adjacent property or public right-of-way.

(C) The restrictions in divisions (A) and (B) of this section do not apply to the following:

(1) Storm runoff allowed under provisions of the City of Albuquerque or Bernalillo County drainage ordinances as currently adopted or subsequently amended;

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(2) Flow resulting from temporary water supply system failures or malfunctions. These failures or malfunctions shall be repaired within 48 hours of notification or the system shut off until repair can be completed;

(3) Flow resulting from firefighting or routine inspection of fire hydrants or from fire training activities;

(4) Water applied as a dust control measure;

(5) Water applied to abate spills of flammable or otherwise hazardous materials, where water is the appropriate methodology;

(6) Water applied to prevent or abate health, safety, or accident hazards when alternate methods are not available;

(7) Flow resulting from routine inspection, operation, or maintenance of a utility water supply system;

(8) Water used in the course of installation or maintenance of traffic flow control devices;

(9) Water used for construction or maintenance activities where the application of water is the appropriate methodology and where no other practical alternative exists.

4-1-7. SPECIAL PERMITS

These restrictions apply to all customers within the Authority's service area.

(A) Use of Misters

(1) The use of misters shall require a special permit, issued by the Authority. The Executive Director shall develop regulations and administrative procedures for the issuance and conditions of such permits. The Executive Director shall have the authority to limit the number of permits or revoke permits as deemed necessary to protect the public interest.

(2) The use of misters without a permit, or in violation of permit conditions, shall constitute a violation of this article and shall be subject to the fee assessment processes described in §§ 4-1-8 and 4-1-99.

(3) Any person, firm, corporation, or municipal or other government facility selling, leasing, renting, installing or otherwise making misters available to any other

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person, firm, corporation, or municipal or other government facility shall provide notification to their customers of the special permit requirement for mister use. Notice may be delivered by prominently posting a sign at the point of purchase or by providing a document to each individual customer. The Authority shall provide approved language for such notification.

4-1-8. EXEMPTIONS AND APPEALS

The Executive Director shall be responsible for the enforcement of this article. The Executive Director may prescribe policies, rules, or regulations to carry out the intent and purposes of this article.

(A) Exemptions to § 4-1-4 (Watering Restrictions) and § 4-1-5 (Water Conservation Requirements for New Construction) and § 4-1-6 (Water Waste), and § 4-1-7 (Special Permits).

(1) Administrative exemptions to the restrictions in §§ 4-1-4, 4-1-5, 4-1-6 and 4-1-7 may be issued by the Executive Director or his/her designee, provided that the general intent of this article has been met, compliance with this article is proven to cause practical difficulties and unnecessary hardship, and all options for abatement through modified water management have been exhausted. The criteria to determine hardship shall include level of capital outlay and time required to be in compliance with this article.

(2) Water Waste Exemptions may be issued for a period not to exceed one year and shall stipulate both short-term corrective measures and a schedule for completion of long-term corrective measures. Variances may be renewed on an annual basis if long-term corrective measures cannot be completed within one year.

(3) Watering Restriction Exemptions may be issued for a period not to exceed 120 days to establish a turf area on properly prepared barren ground.

(4) Watering Restriction Exemptions may be issued for a period not to exceed 30 days to establish newly sodded turf and/or landscape.

(5) Watering Restriction Exemptions may be issued for a period not to exceed 45 days to establish inter-seeded areas with an established turf area.

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(6) Water Conservation Requirements for New Construction Exemptions may be issued upon a showing that as of the date of adoption of the provision on Water Conservation Requirements for New Construction, construction has been completed past a stage where compliance is financially reasonable.

(B) Appeal of § 4-1-4 (Watering Restrictions) and § 4-1-5 (Water Conservation Requirements for New Construction) and § 4-1-6 (Water Waste), and § 4-1-7 (Special Permits) and § 4-1-8 (Exemptions). Any responsible party may appeal fees for violations of §§ 4-1-4, 4-1-5, 4-1-6 and 4-1-7 and denials of service for violations of § 4-1-5 (Water Conservation Requirements for New Construction) to the Executive Director or his/her designee by filing an appeal within seven calendar days of receiving a notice of violation. The notice of violation or denial of service shall provide information on the right to appeal and the procedures to follow. The appeal shall identify the property and state the grounds of appeal together with all material facts in support thereof. A filing fee of \$50 shall be charged for any appeal and for current customers the fee shall be added to the water bill in the event the violation is upheld by the Executive Director or his/her designee. When a hearing is requested, the Executive Director or his/her designee shall send written notice by certified mail, return receipt requested, to the appellant of the time and place of the hearing. At the hearing the appellant shall have the right to present evidence as to the alleged facts upon which the Executive Director or his/her designee based the determination of the need for assessment of fee or restriction of service and any other facts which may aid the Executive Director or his/her designee in determining whether this article has been violated. The Executive Director or his/her designee shall, within seven working days following the hearing, issue a written decision specifying the fee, if appropriate, and the action that must be taken to avoid additional penalty. Fees will be void and service will not be restricted if the written decision is not issued within seven working days.

(C) Judicial Review. The exclusive remedy for parties dissatisfied with the action of the Executive Director or his/her designee on §§ 4-1-4, 4-1-5, 4-1-6 4-1-7 or the denial of an exemption under 4-1-8 shall be the filing of a petition for a writ of certiorari with the State District Court.

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4-1-9. DROUGHT RESPONSE

(A) The Drought Management Strategy defines four levels of drought. The determination of the proper response to any level of drought must be based on factors beyond the defined level of drought.

(B) When any level of drought is declared the Authority may, in its sole discretion impose any of the following drought management provisions. The Authority delegates to the Executive Director the power to determine which of these drought management provisions to impose. The range of drought management provisions available to the Executive Director shall include but not be limited to the following:

(1) Limit the number of days per week that customers can water to three, two or one day a week by limiting properties with certain numbers in their addresses to watering on specific days. The Executive Director may in his discretion exclude properties under the same terms as are provided for at 4-1-4 (D).

(2) Prohibit curbside car washing.

(3) Ban outdoor ornamental water displays and fountains subject to an exemption approved by the Executive Director for specific public displays and fountains.

(4) Ban the addition of water to any swimming pool and/or require a pool cover be used at any time a pool is not in use.

(5) Ban the planting of new turf and/or sod.

(6) Other voluntary or mandatory drought management provisions as provided for in the Drought Management Strategy.

In the event the individual property to be assessed a fee is sub-metered through a master meter account(s), the property in violation will be assessed the fee in accordance with this ordinance through the master meter accounts(s). It shall be the responsibility of the master metered account(s) to assess the collect the fee from the individual sub metered property.

(C) When any level of drought is declared the Authority the Authority delegates to the Executive Director as a drought management provision the discretion to increase water waste fees provided for in this ordinance by a factor of two, three, four or more as may be necessary to assist in water waste reduction during a drought.

**ALBUQUERQUE BERNALILLO COUNTY
WATER UTILITY AUTHORITY
WATER WASTE ORDINANCE**

(D) The Board shall have total discretion to declare a drought by considering the factors set out in the Drought Management Strategy and such evidence as it shall choose to consider. The Board shall have the power to raise and lower the declared Drought Level. On November 1 of any year in which drought has been declared the declaration and all drought management provisions shall expire until the Board makes a new designation of drought and the Executive Director establishes new drought management provisions.

(E) Drought management provisions shall become effective upon posting on the Authority's website and publication in a newspaper of general circulation in the Service Area.

4-1-10. FEES; ASSESSMENT

(A) Fees. Any responsible party who violates any of the provisions of §§ 4-1-4, 4-1-5, 4-1-6 or 4-1-7 shall be subject to progressively higher fees until the violation ceases or a variance is granted. The assessment of fees shall be consecutive for violations separated by less than five calendar years. Fees shall be suspended pending the outcome of an appeal or variance request.

(B) Assessment of Fees. Assessment of fees for violations of the regulations in §§ 4-1-4, 4-1-5, 4-1-6 or 4-1-7 will be through the utility bills for the responsible party's billing account. Fees shall be assessed to the account within 15 days following expiration of the appeal period or issuance of appeal findings. Responsible parties shall be notified of the fee through certified mail within 15 days of the assessment. Fees must be paid within the normal payment period allowed by the utility billing system.

(C) In lieu of fees for violations of §§ 4-1-4 and 4-1-6, the responsible party may have a landscape water audit performed by an authorized landscape irrigation auditor, certified by the Irrigation Association. The audit will be conducted in accordance with the current edition of the Landscape Auditor's Handbook. The audit must be performed within 30 days of notification of violation and the audit recommendation must be implemented within 60 days of the audit. If these deadlines are not met, the fees for violation will apply.

**ALBUQUERQUE BERNALILLO COUNTY
WATER UTILITY AUTHORITY
WATER WASTE ORDINANCE**

4-1-99. PENALTY.

(A) The schedule for assessment of fees for a violation of §§ 4-1-4, 4-1-5, 4-1-6 or 4-1-7 shall be as follows:

- (1) First observed violation - \$20;
- (2) Second observed violation - \$50;
- (3) Third observed violation - \$100;
- (4) Fourth observed violation - \$300;
- (5) Fifth observed violation - \$400;
- (6) Sixth observed violation - \$600;
- (7) Seventh observed violation - \$800;
- (8) Eighth observed violation - \$1,000;
- (9) Ninth observed violation - \$2,000

(10) Each observed violation over the ninth - \$2,000 plus an additional \$1,000 each violation after that (e.g. \$3,000 for the tenth violation, \$4,000 for the eleventh violation, etc.)

(B) For the purpose of assessing fees for violations of §§ 4-1-4, 4-1-5, 4-1-6 or 4-1-7, any previous violation shall not be considered if:

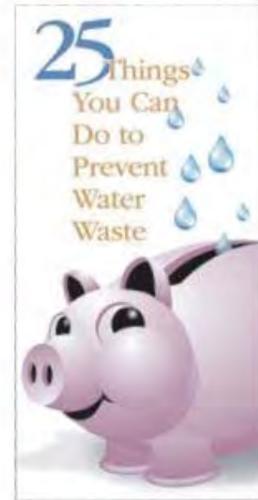
- (1) A period of five years has elapsed since the violation was incurred; or
- (2) The property is acquired by a new owner.

(C) Any person who violates the provisions of this article for which no other penalty is set forth, shall be subject to the general penalty provision of this code set forth in § 4-1-99.

APPENDIX C – AWWA CONSERVATION PAMPHLET EXAMPLES

The following pamphlets are available on the AWWA website at: www.awwa.org/bookstore

Figures 1.1, 1.2, 1.3

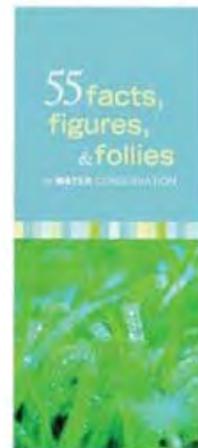
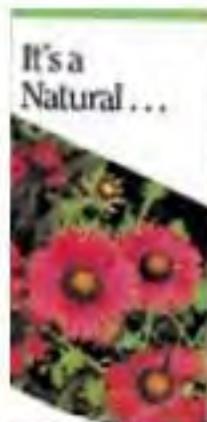


Water Conservation at Home discusses in-home conservation practices for bathroom, kitchen and outdoor water use (see Figure 1.1).

Landscaping to Save Water explains the seven principles in the Xeriscape(tm) concept that promotes attractive landscapes, conserves water, and protects the environment (see Figure 1.2).

25 Things You Can Do to Prevent Water Waste has 25 easy things people can do to conserve water inside and outside their homes (see Figure 1.3).

Figures 1.4, 1.5, 1.6

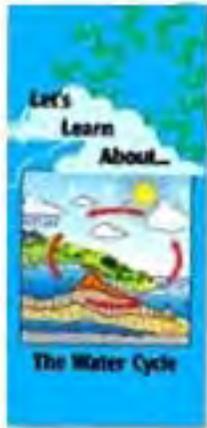


5 Basic Ways to Conserve Water provides 5 things people can do to cut water use by 25% (see Figure 1.4)

It's a Natural is an introduction to planning a water-conserving home landscape (see Figure 1.5)

55 Facts, Figure and Follies of Water Conservation is a list of 55 items that promote water conservation (see Figure 1.6).

Figures 1.7, 1.8, 1.9

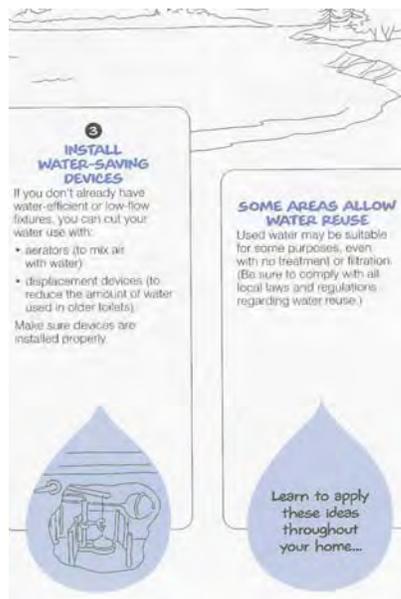
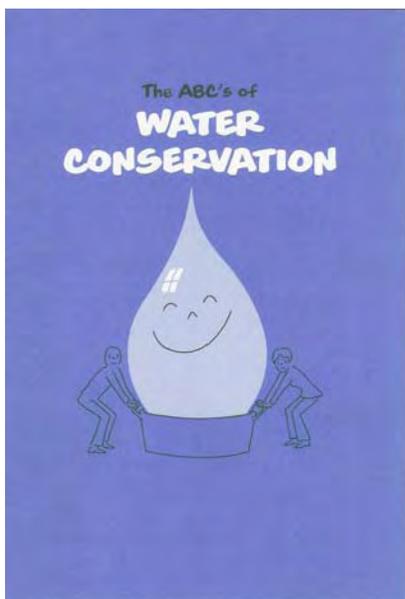


Let's Learn About...The Water Cycle diagrams the seven stages of the water cycle (see Figure 1.7)

A Consumer's Guide to Water Conservation the Inside Story gives eight ways to reduce water waste inside the home (see Figure 1.8).

A Consumer's Guide to Water Conservation the Outside Story gives eight ways to reduce water waste in landscaping (see Figure 1.9).

Pershing County Water Conservation Guide and Sample Page:



APPENDIX D – LANDSCAPE GUIDES

The following list is taken from the Truckee Meadows Water Authority (TMWA) website. More information on these plants, including color photos can be found at www.tmwandscapeguide.com.

PERENNIAL FLOWERS

[Artemisia species](#)/Sage or Wormwood (Perennial)—water use: Very Low

[Eriogonum umbellatum](#)/Sulfur Flowered Buckwheat (Perennial)—water use: Very Low

[Achillea species](#)/Yarrow (Perennial)—water use: Low

[Agastache cana](#)/Bubblemint (Perennial)—water use: Low

[Aurinia saxatilis](#)/Basket-of-Gold (Perennial)—water use: Low

[Coreopsis species](#)/Tickseed (Perennial)—water use: Low

[Crocus species](#)/Spring Crocus (Perennial)—water use: Low

[Dianthus species](#)/Pinks (Perennial)—water use: Low

[Eschscholzia californica](#)/California poppy (Perennial)—water use: Low

[Gaillardia grandiflora](#)/Blanket Flower (Perennial)—water use: Low

[Iris germanica](#)/Iris germanica (Perennial)—water use: Low

[Linum species](#)/Flax (Perennial)—water use: Low

[Narcissus species](#)/Daffodil or Narcissus (Perennial)—water use: Low

[Nepeta racemosa](#)/Catmint (Perennial)—water use: Low

[Oenothera species](#)/Evening Primrose (Perennial)—water use: Low

[Perovskia atriplicifolia](#)/Russian Sage (Perennial)—water use: Low

[Sedum species](#)/Stonecrop (Perennial)—water use: Low

[Senecio Cineraria](#)/Dusty Miller (Perennial)—water use: Low

[Stachys byzantina](#)/Lamb's Ears (Perennial)—water use: Low

[Thermopsis montana](#)/No Lupine (Perennial)—water use: Low

[Tulbaghia violacea](#)/Society Garlic (Perennial)—water use: Low

[Alcea rosea](#)/Hollyhock (Perennial)—water use: Moderate

[Antirrhinum majus](#)/Snapdragon (Perennial)—water use: Moderate

[Armeria maritima](#)/Sea Pinks (Perennial)—water use: Moderate

[Aster species](#)/Aster (Perennial)—water use: Moderate

[Echinacea purpurea](#)/Coneflower (Perennial)—water use: Moderate

[Gaura lindheimeri](#)/Gaura (Perennial)—water use: Moderate

[Geranium species](#)/Handy Geranium (Perennial)—water use: Moderate

[Gypsophila species](#)/Baby's Breath (Perennial)—water use: Moderate

[Hemerocallis hybrids](#)/Daylily (Perennial)—water use: Moderate

[Heuchera sanguinea](#)/Coral Bells (Perennial)—water use: Moderate

[Iberis sempervirens](#)/Candytuft (Perennial)—water use: Moderate

[Kniphofia uvaria](#)/Red Hot Poker (Perennial)—water use: Moderate

[Lavandula angustifolia](#)/Lavender (Perennial)—water use: Moderate

[Lilium species](#)/Lily (Perennial)—water use: Moderate

[N/A](#)/Pussy toes (Perennial)—water use: moderate

[Papaver species](#)/Poppy (Perennial)—water use: Moderate

[Penstemon species](#)/Beard Tongue (Perennial)—water use: Moderate

[Platycodon grandiflorus](#)/Balloon Flower (Perennial)—water use: Moderate

[Rudbeckia fulgida](#)/Black-Eyed Susan (Perennial)—water use: Moderate

[Salvia Species](#)/Sage or Salvia (Perennial)—water use: Moderate

[Saponaria species](#)/Soapwort (Perennial)—water use: Moderate

[Tanacetum species](#)/Painted or Michaelmas Daisy (Perennial)—water use: Moderate

[Tulipa species](#)/Tulip (Perennial)—water use: Moderate

[Veronica spicata](#)/Spike Speedwell (Perennial)—water use: Moderate

[Viola species](#)/Violet or Pansy (Perennial)—water use: Moderate

GROUNDCOVERS, VINES, AND GRASSES

[Opuntia polyacantha](#)/Prickly Pear Cactus (Groundcovers)—water use: Very Low

[Clematis species](#)/Clematis (Groundcovers)—water use: Low

[Euphorbia species](#)/Spurge (Groundcovers)—water use: Low

[Helictorichon sempervirens](#)/Blue Oat Grass (Groundcovers)—water use: Low

[Hypericum calycinum](#)/Jacob's Ladder or Aaron's Beard (Groundcovers)—water use: Low

[Juniperus horizontalis](#)/Groundcover Junipers (Groundcovers)—water use: Low

[Lathyrus latifolius](#)/Perennial Sweet Pea (Groundcovers)—water use: Low

[Lonicera species](#)/Honeysuckle (Groundcovers)—water use: Low

[Panicum virgatum](#)/Switch Grass (Groundcovers)—water use: Low

[Polygonum species](#)/Polygonum (Groundcovers)—water use: Low

[Santolina species](#)/Lavender Cotton (Groundcovers)—water use: Low

[Vinca minor](#)/Dwarf Periwinkle (Groundcovers)—water use: Low

[Wisteria sinensis](#)/Chinese Wisteria (Groundcovers)—water use: Low

[Zauschneria californica](#)/California Fuschia (Groundcovers)—water use: Low

[Calmagrostis x acutiflora](#)/Feather Reed Grass (Groundcovers)—water use: Moderate

[Campsis radicans](#)/Red Trumpet Creeper (Groundcovers)—water use: Moderate

[Cerastium tomentosum](#)/Snow in Summer (Groundcovers)—water use: Moderate

[Delosperma cooperi](#)/Hardy Purple Ice Plant (Groundcovers)—water use: Moderate

[Hedera helix](#)/Ivy (Groundcovers)—water use: Moderate

[Helianthemum nummularium](#)/Sunrose (Groundcovers)—water use: Moderate

[Mahonia repens](#)/Creeping Mahonia (Groundcovers)—water use: Moderate

[N/A](#)/Northern seacats (Groundcovers)—water use: moderate

[Phlox subulata](#)/Moss Pink (Groundcovers)—water use: Moderate

[Potentilla neumanniana](#)/Cinquefoil (Groundcovers)—water use: Moderate

[Sedum species](#)/Stonecrop (Groundcovers)—water use: Moderate

[Thymus species](#)/Thyme (Groundcovers)—water use: Moderate

SHRUBS

[Artemisia tridentata var. tridentata](#)/Big Sagebrush (Shrubs)—water use: Very Low

[Atriplex canescens](#)/Four Wing Saltbrush (Shrubs)—water use: Very Low

[Chrysothamnus nauseosus](#)/Rubber Rabbitbrush (Shrubs)—water use: Very Low

[Amelanchier species](#)/Serviceberry or Juneberry (Shrubs)—water use: Low

[Aronia species](#)/Chokeberry (Shrubs)—water use: Low

[Berberis species](#)/Barberry (Shrubs)—water use: Low

[Caragana species](#)/Peashrub (Shrubs)—water use: Low

[Caryopteris x clandonensis](#)/Blue Mist Spiraea (Shrubs)—water use: Low

[Chaenomeles speciosa](#)/Flowering Quince (Shrubs)—water use: Low

[Cytisus species](#)/Broom (Shrubs)—water use: Low

[Elaeagnus commutata](#)/Silverberry (Shrubs)—water use: Low

[Euonymus species](#)/Euonymus (Shrubs)—water use: Low

[Forestiera neomexicana](#)/New Mexico Privet (Shrubs)—water use: Low

[Genista species](#)/Dwarf Broom (Shrubs)—water use: Low

[Hibiscus syriacus](#)/Rose of Sharon (Shrubs)—water use: Low

[Ligustrum species](#)/Privet (Shrubs)—water use: Low

[Lonicera tatarica](#)/Tatarian Honeysuckle (Shrubs)—water use: Low

[Mahonia aquifolium](#)/Oregon Grape (Shrubs)—water use: Low

[Pinus mugo](#)/Mugo Pine (Shrubs)—water use: Low

[Prunus species](#)/Bush Cherry (Shrubs)—water use: Low

[Pyracantha coccinea](#)/Firethorn or Pyracantha (Shrubs)—water use: Low

[Rhus species](#)/Sumac (Shrubs)—water use: Low

[Ribes aureum](#)/Golden Currant (Shrubs)—water use: Low

[Shepherdia argentea](#)/Silver Buffaloberry (Shrubs)—water use: Low

[Symphoricarpos albus](#)/Snowberry (Shrubs)—water use: Low

[Syringa vulgaris](#)/Common Lilac (Shrubs)—water use: Low

[Yucca species](#)/Yucca (Shrubs)—water use: Low

[Acer circinatum](#)/Vine Maple (Shrubs)—water use: moderate

[Amorpha canescens](#)/Leadplant (Shrubs)—water use: moderate

[Buddleia species](#)/Butterfly Bush (Shrubs)—water use: Moderate

[Catalpa x Chilopsis](#)/Chitalpa (Shrubs)—water use: moderate

[Ceratoides lanata](#)/Winterfat (Shrubs)—water use: moderate

[Cercocarpus ledifolius](#)/Mt. Mahogany (Shrubs)—water use: moderate

[Chamaebatiaria millifolium](#)/Fernbush (Shrubs)—water use: moderate

[Chilopsis linearis](#)/Desert or Flowering Willow (Shrubs)—water use: moderate

[Cotoneaster species](#)/Cotoneaster (Shrubs)—water use: Moderate

[Cowania mexicana](#)/Cliffrose (Shrubs)—water use: moderate

[Fallugia paradoxa](#)/Apache Plume (Shrubs)—water use: moderate

[Forsythia species](#)/Forsythia (Shrubs)—water use: Moderate

[Hamamelis x intermedia](#)/Witch Hazel (Shrubs)—water use: Moderate

[Hesperaloe parviflora](#)/Red Yucca (Shrubs)—water use: moderate

[Juniperus chinensis](#)/Sea Green Juniper (Shrubs)—water use: Moderate

[Kerria japonica](#)/Kerria (Shrubs)—water use: Moderate

[Kolkwitzia amabilis](#)/Beautybush (Shrubs)—water use: moderate

[Philadelphus virginalis](#)/Mock Orange (Shrubs)—water use: Moderate

[Picea glauca var. albertiana 'Conica'](#)/Dwarf Alberta Spruce (Shrubs)—water use: Moderate

[Pinus contorta 'Latifolia'](#)/Lodgepole Pine (Shrubs)—water use: moderate

[Potentilla fruticosa](#)/Shrubby Potentilla (Shrubs)—water use: Moderate

[Purshia tridentata](#)/Bitterbrush (Shrubs)—water use: moderate

[R. frangula 'Asplenifolia'](#)/Fernleafed buckthorn (Shrubs)—water use: Moderate

[R. frangula 'Columnaris'](#)/Tall Hedge Buckthorn (Shrubs)—water use: Moderate

[Rhamnus frangulia](#)/Sea buckthorn (Shrubs)—water use: Moderate

[Rosa species](#)/Hardy Shrub Roses (Shrubs)—water use: Moderate

[Spiraea species](#)/Spiraea (Shrubs)—water use: Moderate

[Symphoricarpa x chenaultii](#)/Coralberry 'Hancock' (Shrubs)—water use: Moderate

[Thuja occidentalis](#)/American Arborvitae (Shrubs)—water use: Moderate

[Viburnum species](#)/Viburnum (Shrubs)—water use: Moderate

TREES

[Acer ginnala](#)/Amur Maple (Trees)—water use: Deep Water 10-14 days

[Ailanthus altissima](#)/Tree of Heaven (Trees)—water use: Deep Water 10-14 days

[Calocedrus decurrens](#)/Incense Cedar (Trees)—water use: Deep Water 10-14 days

[Catalpa species](#)/Catalpa (Trees)—water use: Deep Water 10-14 days

[Cedrus atlantica glauca](#)/Blue Atlas Cedar (Trees)—water use: Deep Water 10-14 days

[Celtis occidentalis](#)/Hackberry (Trees)—water use: Deep Water 10-14 days

[Crataegus species](#)/Hawthorn (Trees)—water use: Deep Water 10-14 days

[Elaeagnus angustifolia](#)/Russian Olive (Trees)—water use: Deep Water 10-14 days

[Gleditsia triacanthos inermis](#)/Honeylocust (Trees)—water use: Deep Water 10-14 days

[Juniperus species](#)/Tree Juniper (Trees)—water use: Deep Water 10-14 days

[Maackia amurensis](#)/Maackia (Trees)—water use: Deep Water 10-14 days

[Maclura pomifera](#)/Osage Orange (Trees)—water use: Deep Water 10-14 days

[Malus hybrids](#)/Crabapple (Trees)—water use: Deep Water 10-14 days

[Pinus species](#)/Pine (Trees)—water use: Deep Water 10-14 days

[Platanus acerifolia](#)/Sycamore (Trees)—water use: Deep Water 10-14 days

[Quercus species](#)/Oak (Trees)—water use: Deep Water 10-14 days

[Robinia species](#)/Locust (Trees)—water use: Deep Water 10-14 days

[Sequoiadendron giganteum](#)/Giant Redwood (Trees)—water use: Deep Water 10-14 days

[Ulmus parvifolia](#)/Chinese elm (Trees)—water use: Deep Water 10-14 days

[Zelkova serrata](#)/Zelkova (Trees)—water use: Deep Water 10-14 days

[Aesculus hippocastanum](#)/Common Horsechestnut (Trees)—water use: Deep Water 7-10 days

[Carpinus betulus](#)/Hornbeam (Trees)—water use: Deep Water 7-10 days

[Cotinus coggygria](#)/Smoke Tree (Trees)—water use: Deep Water 7-10 days

[Cupressus glabra](#)/Arizona Cypress (Trees)—water use: Deep Water 7-10 days

[Fraxinus species](#)/Ash (Trees)—water use: Deep Water 7-10 days

[Ginkgo biloba](#)/Maidenhair Tree (Trees)—water use: Deep Water 7-10 days

[Koelreuteria paniculata](#)/Golden Rain Tree (Trees)—water use: Deep Water 7-10 days

[Laburnum watereri](#)/Golden Chain Tree (Trees)—water use: Deep Water 7-10 days

[Liquidambar styraciflua](#)/Sweetgum (Trees)—water use: Deep Water 7-10 days

[Liriodendron tulipifera](#)/Tulip Tree (Trees)—water use: Deep Water 7-10 days

[Malus domestica](#)/Fruiting Apple Tree (Trees)—water use: Deep Water 7-10 days

[Morus alba](#)/Mulberry (Trees)—water use: Deep Water 7-10 days

[Phellodendron amurense](#)/Amur Cork Tree (Trees)—water use: Deep Water 7-10 days

[Picea species](#)/Spruce (Trees)—water use: Deep Water 7-10 days

[Pistacia chinensis](#)/Chinese Pistache (Trees)—water use: Deep Water 7-10 days

[Prunus species](#)/Plum or Cherry (Trees)—water use: Deep Water 7-10 days

[Pyrus Species](#)/Pear (Trees)—water use: Deep Water 7-10 days

[Sophora japonica](#)/Japanese Pagoda Tree (Trees)—water use: Deep Water 7-10 days

[Sorbus species](#)/Mountain Ash (Trees)—water use: Deep Water 7-10 days

[Thuja occidentalis](#)/Arborvitae (Trees)—water use: Deep Water 7-10 days

[Tilia species](#)/Linden (Trees)—water use: Deep Water 7-10 days

[Gymnocladus dioica](#)/Kentucky Coffee Tree (Trees)—water use: Moderate

[Juniperus monosperma](#)/Singleseed Juniper (Trees)—water use: moderate

[Pinus edulis](#)/Pinon Pine (Trees)—water use: moderate

APPENDIX E – EXAMPLES OF WATER CONSERVATION MEASURES

Conservation measures are divided into two types: (1) Hardware/Equipment and (2) Behavioral/Managerial. Each of these is subdivided into five categories of application: (1) Residential, (2) Landscape, (3) Industrial, Commercial, and Institutional (ICI) (4) Agricultural, and (5) Purveyor. The following conservation measures will be classified first by application and then by type. These measures are suggestions and can only be enforced if included as part of an ordinance.

A.1 RESIDENTIAL CONSERVATION MEASURES

A.1.1 Behavioral Measures

A.1.1.1 Residential Water Audits. Water audits could target high use customers first and then be offered to all customers. The following elements should be part of an effective audit.

- Purpose for the audit.
- Estimation of use for all fixtures and appliances.
- Check for and repair leaks.
- Evaluation of Landscape (See "Landscape Conservation Measures)
- Evaluation of outdoor water use.
- Evaluate efficiency measures.
- Educate customers using available flyers

An audit should take no more than 30 to 45 minutes.

A.1.1.2 Additional Measures. The sample pamphlets in Appendix A include additional behavioral conservation measures.

A.1.2 Hardware/Equipment Measures

The following is a list of devices/practices that will reduce water consumption in the home.

Measure	Description
<i>Bathroom/Kitchen Fixtures</i>	
Low-flow toilets	1.6 gallons per flush
Toilet retrofit devices	Bladders (bags), dams, early close flappers, other hardware and adjustments
Toilet leak repairs	Includes detection (dye tabs) and replacement of worn parts.
Low-volume shower heads	2.5 gallons per minute @ 80 psi
Showerhead retrofit devices	Includes temporary cutoff valves and restrictors.
Low-volume faucets	2.5 gallons per minute @ 80 psi
Faucet retrofit devices	Includes aerators, activation sensors, self closing and metered valves
Faucet maintenance	Includes washer replacement, repacking, tightening, and cleaning aerators
Water pressure reduction	Only needed if house pressure exceeds what's required
<i>High Efficiency Appliances</i>	
Clothes washers	27 gallons per load
Dish washers	4.5 gallons per load

A.2 LANDSCAPE CONSERVATION MEASURES

A.2.1 Behavioral Measures

A.2.1.1 Landscape Water Audits. Landscape water audits should be conducted on park and golf course irrigation systems and could be considered an option on residential irrigation systems, targeting high-volume users.

- Purpose for the audit.
- Estimation of outdoor use based on meter records.
- Check for and repair leaks.
- Evaluation of Landscape (size, soil, amount of turf, types of plants)
- Evaluation of irrigation system (Timers, Use of drip, Precipitation amounts).
- Efficiency recommendations.
- Educate customers using available flyers

A residential landscape audit should take no more than an hour. Parks and golf courses could take substantially longer.

A.2.1.2 Xeriscape™. Xeriscape is a method of landscaping that employs low-water use plants, turf, ground covers, shrubs and trees. It includes careful planning, soil analysis, and irrigation system design.

A.1.1.3 Additional Measures. The sample pamphlets in Section 5.1 include additional behavioral conservation measures.

A.2.2 Hardware/Equipment Measures

Landscape hardware measures consist of two basic groups: (1) Landscape materials and (2) irrigation equipment.

Measure	Description
<i>Landscape Materials</i>	
Trees, plants, and grass	Should be well suited to climate and altitude and be drought tolerant
Organic mulch	Grass clippings, leaves, wood chips, bark, and pine needles. Organic mulches help to retain soil moisture and keep ground cool around plants.
Inorganic mulch	Boulders, gravel, pavers, decomposed granite, and stepping stones. Inorganic mulches are generally more for decorative purposes but they reduce the amount of trees, plants, and turf thereby conserving water.
Compost	Made of manure or biosolids and wood, straw, grass, and leaves. Helps plants stay healthy and retains moisture in the soil.
<i>Irrigation Equipment</i>	
Valves	Should be sized to meet requirements and checked periodically for leaks
Sprinkler Heads	Should match water volume requirements of area being irrigated.
Sprinkler Nozzles	Should have proper arc of coverage and proper trajectory.
Irrigation Controllers	Should have required number of stations, programs, and starts. Also rain delays and sensor terminals.
Drip irrigation	Insures water is directed to where it's needed.

A.3 INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL (ICI) CONSERVATION MEASURES

A.3.1 Behavioral and Hardware/Equipment Measures

A.3.1.1 ICI Water Audits. Since ICI water audits can require a substantial amount of time (4 hours or more), it may be necessary to have a private engineering firm hired by the water user conduct the audit. There is incentive for ICI customers to pay for audits since the results of an audit could translate into substantial savings. An ICI water audit should include the following elements:

- Support from ICI owners, managers, and employees
- Survey/Estimation of facility use based on meter records.
- Calculation of water-related costs.
- Evaluation of efficiency measures.
- Evaluation of payback periods for measures.
- Efficiency recommendations and implementation.
- Tracking and reporting system.

A.3.1.2 Manual Washing. Manual washing is cleaning done on surfaces with hoses and cloths.

MANUAL WASHING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Surfaces should be swept or brushed off before using water to clean. 	<ul style="list-style-type: none"> • High pressure low-volume hoses with automatic shut-off nozzles • High-pressure pumps, steam cleaners.

A.3.1.3 Vehicle Washing. Vehicle washing includes manual washing and automated car washes or a combination of both.

VEHICLE WASHING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Limit number of spray nozzles and set flow rates at lowest volume and pressure required. • Adjust nozzles in automated systems so that they take full advantage of gravity and position. Also make sure water shuts off after vehicles have passed. • Increase conveyor speeds or reduce rinse cycle time. • Sweep wash area before using water to clean. • Establish a regular maintenance schedule that includes checking for leaks and making repairs. 	<ul style="list-style-type: none"> • Recycling systems. These would include filters and storage tanks. • High pressure pumping systems.

A.3.1.4 Kitchens and Restaurants. Kitchen and restaurant conservation is divided into four areas of application; 1. Food and drink preparation, 2. Dishwashing, 3. Garbage disposal and scraping trough, and 4. Ice making.

FOOD AND DRINK PREPARATION

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Presoak and wash food service articles in basins instead of running water. • Reduce thawing of food with hot water unless required by law. If required use lower flow. • Avoid running water to melt ice in sinks. • Use full loads in dishwashers and other automated equipment. • Serve water only when requested by customers. 	<ul style="list-style-type: none"> • Low-volume faucets • Hands-free foot pedal valves for faucets • On demand hot water dispensers

DISHWASHING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Presoak utensils, dishes, and pots and pans in basins of water instead of using running water prior to loading dishwashing machines. • Scrape food off of plates rather than use running water. • Operate scraping troughs only while dishes are actually being washed. • Assess the water efficiency of the current dishwashing system to determine where improvements might be made. • Always wash full loads in automated machines. • Operate conveyor type dishwashers only when dishes are actually passing through the machine. • Verify that the dishwashing equipment is using the minimum amount of flow recommended by the manufacturer. • Since many older automated dishwashing systems are neither energy nor water efficient, evaluate the cost of retrofitting or replacing existing equipment. • Turn dishwashers off when not in use. • Routinely check all dishwashing equipment to ensure there are no leaks. • Post signs requesting that personnel minimize their use of utensils, dishes, and pots and pans to save water. 	<ul style="list-style-type: none"> • Manual pre-wash sprayers with “dead man” shut off controls. • Low-flow spray heads on all sprayers. • New water efficient dishwashing equipment. • Electronic eye sensors that shut off conveyer type systems when dishes are not passing through the machine.

GARBAGE DISPOSER AND SCRAPING TROUGH

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Eliminate disposers and troughs. • Use the minimum acceptable flow rate on all machines. • Reuse wastewater in the mixing chamber of the disposer. 	<ul style="list-style-type: none"> • Garbage strainers (instead of disposers) • Sensors that detect the amount of flow in a disposer and regulate flow accordingly. • Solenoid valves that turn water off when the disposer is off. • Flow regulators for disposer supply lines.

ICE MAKERS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Use the minimum flow rate recommended by the manufacturer on water cooled icemakers. • Adjust machines to produce ice only when it's needed. <p>Collect spent cooling water and reuse it for non-potable purposes.</p>	<ul style="list-style-type: none"> • Air-cooled icemakers. • Re-circulating systems for water-cooled icemakers. • Ice flake machines that use less bleed off than cube machines.

A.3.1.5 Laundries and Laundromats. This section includes measures that are applicable in hotels, motels, hospitals, nursing homes, diaper services, restaurants, and coin operated Laundromats.

LAUNDRIES AND LAUNDROMATS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Operate equipment with full loads only. • Reduce water levels for partial loads. • Back flush filters or softeners only when necessary. 	<ul style="list-style-type: none"> • Computer controlled rinse water reclamation systems. • Wash and rinse water treatment and reclamation systems. • Continuous batch washers. • Ozone laundry systems. • Horizontal axis washers.

A.3.1.6 Swimming Pools. The measures in this section can be applied to commercial and residential swimming pools.

SWIMMING POOLS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Limit the frequency of pool refilling. • Cover the pool with an insulated cover when not in use to reduce losses due to heat and evaporation. • Reduce the level of the pool to avoid losses due to splashing. • Lower the pool temperature. • Back wash filters only when necessary. If timed, verify that frequency is efficient. • Regularly check pool for leaks and cracks. Keep pool and filter clean to avoid unnecessary backwashing. 	<p>There are no special equipment measures that would help conserve water in pools. It is important however that available equipment is efficient and used properly.</p>

A.3.1.7 Cooling Systems. This section includes measures for three types of cooling systems: 1. Single-pass, 2. Evaporative, and 3. Equipment. Single-pass cooling uses fresh water to cool without re-circulating any of the water used in the first pass. Evaporative coolers are used for cooling in commercial and residential applications and are commonly known as swamp coolers. Equipment cooling includes both single-pass and re-circulating systems that are used to cool equipment and machinery.

SINGLE-PASS COOLING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Reuse water for landscaping, vehicle washing, or another cooling application that allows for water to be at a higher temperature. • Eliminate single-pass systems. 	<ul style="list-style-type: none"> • Air-cooled equipment (i.e. compressors, pumps, icemakers, etc...) • Automatic controls that insure coolers only operate when needed.

EVAPORATIVE COOLING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Regularly check for leaks in hoses and pan. • Replace pads at least annually. • Shut cooler off when building is unoccupied. • Annually service the equipment by oiling moving parts and cleaning off accumulated scale or corrosion. 	<p>There are currently no equipment measures for evaporative coolers. The design of the coolers is relatively simple.</p>

EQUIPMENT COOLING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Reuse water in single pass systems for other cooling purposes. Examples of reuse include cooling molten materials, landscape, of boiler make-up water. • Replace al single pass cooling systems with closed-loop systems or replace water-cooled equipment with air-cooled. 	

A.3.1.8 Heating Systems. This section deals with conservation measures for boilers and steam generators which are used to heat large buildings and multiple-building facilities.

HEATING SYSTEMS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Regularly inspect systems for leaks and make repairs. • Insulate all piping. • Limit boiler bleed-off to a level that satisfies water quality requirements. • Discharge blow-down into an expansion tank instead of using cold water to cool it. 	<ul style="list-style-type: none"> • Flow meters for make-up and blow-down valves. • Automatic controls to discharge blow-down.

A.3.1.9 Leaks and Water Losses. This section covers water conservation measures relating to leaks and losses.

LEAKS AND WATER LOSSES

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Regularly check for leaks at all water connections. Keep in mind that higher pressure applications have more incidence of leakage. • Regularly check all vessels that contain water for cracks or bad seals. • Regularly check all heating and cooling systems. • Repair any leaks that are discovered. 	<ul style="list-style-type: none"> • Leak detection equipment. This could include sonic or probe type equipment. • Any equipment used to stop a leak. This would depend on the material of the pipe or vessel that has a leak.

A.3.1.10 ICI Maintenance Practices. This section reemphasizes maintenance conservation measures for ICI facilities that have been mentioned in previous sections. These measures should become standard procedure at all ICI facilities.

- Create a maintenance schedule that includes schedules for leak detection inspections and meter reading, and repair procedures.
- Monitor water-use records keeping track of any increases or decreases in use.
- Conduct water audits every one to three years.
- Shut off supply lines to areas that are not being used.
- Install pressure reducers where feasible.
- Keep a maintenance schedule to clean cooling and heating equipment regularly.
- Recycle and reuse water when feasible.
- Insulate all hot water pipes.
- Replace old equipment with water saving equipment.
- Install timers wherever possible.
- Educate employees on water saving techniques.

A.4 GENERAL CONSERVATION MEASURES

This list of conservation behaviors and is divided into four parts: Home, Landscaping, Community, and Miscellaneous.

HOME BEHAVIORS

1. When washing dishes by hand, don't let the water run while rinsing. Fill one sink with wash water and the other with rinse water.
2. Evaporative coolers require a seasonal maintenance checkup. For more efficient cooling, check your evaporative cooler annually.
3. Run your washing machine and dishwasher only when they are full and you could save 1000 gallons a month.
4. Use the garbage disposal sparingly. Compost instead and save gallons every time.
5. Keep a pitcher of water in the refrigerator instead of running the tap for cold drinks, so that every drop goes down you not the drain.
6. Check your water meter and bill to track your water usage.
7. Wash your produce in the sink or a pan that is partially filled with water instead of running water from the tap.
8. Use a broom instead of a hose to clean your driveway or sidewalk and save 80 gallons of water every time.
9. If your shower can fill a one-gallon bucket in less than 20 seconds, then replace it with a water efficient showerhead.
10. Collect the water you use for rinsing produce and reuse it to water houseplants.
11. We're more likely to notice leaky faucets indoors, but don't forget to check outdoor faucets, pipes, and hoses for leaks.
12. When you shop for a new appliance, consider one offering cycle and load size adjustments. They are more water and energy-efficient than older appliances.
13. Time your shower to keep it under 5 minutes. You'll save up to 1000 gallons a month.
14. Install low-volume toilets.
15. When you clean your fish tank, use the water you've drained on your plants. The water is rich in nitrogen and phosphorus, providing you with a free and effective fertilizer.
16. Put food coloring in your toilet tank. If it seeps into the toilet bowl, you have a leak. It's easy to fix, and you can save more than 600 gallons a month.
17. Plug the bathtub before turning the water on, and then adjust the temperature as the tub fills up.
18. Designate one glass for your drinking water each day. This will cut down on the number of times you run your dishwasher.

19. Don't use running water to thaw food.
20. Grab a wrench and fix that leaky faucet. It's simple, inexpensive, and can save 140 gallons a week.
21. When doing laundry, match the water level to the size of the load.
22. Teach your children to turn the faucets off tightly after each use.
23. Before you lather up, install a low-flow showerhead. They're inexpensive, easy to install, and can save your family more than 500 gallons a week.
24. Soak your pots and pans instead of letting the water run while you scrape them clean.
25. Make sure you know where your master water shut-off valve is located. This could save gallons of water and damage to your home if a pipe were to burst.
26. Turn off the water while you brush your teeth and save 4 gallons a minute. That's 200 gallons a week for a family of four.
27. Make sure your toilet flapper doesn't stick open after flushing.
28. Make sure there are aerators on all of your faucets.
29. Install an instant water heater on your kitchen sink so you don't have to let the water run while it heats up. This will also reduce heating costs for your household.
30. Cut back on rinsing if your dishwasher is new. Newer models clean more thoroughly than older ones.
31. Bathe your young children together.
32. Winterize outdoor spigots when temps dip to 20 degrees F to prevent pipes from bursting or freezing.
33. Insulate hot water pipes so you don't have to run as much water to get hot water to the faucet.
34. Drop that tissue in the trash instead of flushing it and save gallons every time.
35. If your toilet was installed prior to 1980, place a toilet dam or bottle filled with water in your toilet tank to cut down on the amount of water used for each flush. Be sure these devices do not interfere with operating parts.
36. Install water softening systems only when necessary. Save water and salt by running the minimum number of regenerations necessary to maintain water softness.
37. Wash clothes only when you have a full load and save up to 600 gallons each month.
38. Listen for dripping faucets and toilets that flush themselves. Fixing a leak can save 500 gallons each month.
39. Cook food in as little water as possible. This will also retain more of the nutrients.
40. Turn the water off while you shampoo and condition your hair and you can save more than 50 gallons a week.
41. Choose new water-saving appliances, like washing machines that save up to 20 gallons per load.

42. Select the proper size pans for cooking. Large pans require more cooking water than may be necessary.
43. Turn off the water while you shave and you can save more than 100 gallons a week.
44. To save water and time, consider washing your face or brushing your teeth while in the shower.
45. For hanging baskets, planters and pots, place ice cubes under the moss or dirt to give your plants a cool drink of water and help eliminate water overflow.
46. Throw trimmings and peelings from fruits and vegetables into your yard compost to prevent from using the garbage disposal.
47. Keep a bucket in the shower to catch water as it warms up or runs. Use this water to flush toilets or water plants.
48. When you are washing your hands, don't let the water run while you lather.
49. Pre-treat stains before washing clothes to avoid re-washing.
50. Use the shortest wash cycle for lightly soil cloths.
51. Check washing machine hoses regularly for leaks.
52. Do not pre-rinse dishes except in cases of sticky or burn-on food.
53. Scrape off food with a utensil or used paper napkin when pre-cleaning for dishwasher.

LANDSCAPE BEHAVIORS

1. Check your sprinkler system frequently and adjust sprinklers so only your lawn is watered and not the house, sidewalk, or street.
2. Avoid planting turf in areas that are hard to water such as steep inclines and isolated strips along sidewalks and driveways.
3. Plant during the spring or fall when the watering requirements are lower.
4. Minimize evaporation by watering during the early morning hours, when temperatures are cooler and winds are lighter.
5. Use a layer of organic mulch around plants to reduce evaporation and save hundreds of gallons of water a year.
6. Divide your watering cycle into shorter periods to reduce runoff and allow for better absorption every time you water.
7. Only water your lawn when needed. You can tell this by simply walking across your lawn. If you leave footprints, it's time to water.
8. Adjust your lawn mower to a higher setting. Longer grass shades root systems and holds soil moisture better than a closely clipped lawn.
9. Use the sprinkler for larger areas of grass. Water small patches by hand to avoid waste.

10. Use porous materials for walkways and patios to keep water in your yard and prevent wasteful runoff.
11. Direct downspouts and other runoff towards shrubs and trees, or collect and use for your garden.
12. Install a rain shut-off device on your automatic sprinklers to eliminate unnecessary watering.
13. Choose a water-efficient drip irrigation system for trees, shrubs and flowers. Watering at the roots is very effective, be careful not to over water.
14. Reduce the amount of grass in your yard by planting shrubs and ground cover with rock and granite mulching.
15. Remember to check your sprinkler system valves periodically for leaks and keep the heads in good shape.
16. Don't water your lawn on windy days. After all, sidewalks and driveways don't need water.
17. Water your plants deeply but less frequently to create healthier and stronger landscapes.
18. When watering grass on steep slopes, use a soaker hose to prevent wasteful runoff.
19. Group plants with the same watering needs together to get the most out of your watering time.
20. Remember to weed your lawn and garden regularly. Weeds compete with other plants for nutrients, light, and water.
21. While fertilizers promote plant growth, they also increase water consumption. Apply the minimum amount of fertilizer needed.
22. Avoid installing ornamental water features and fountains that spray water into the air. Trickling or cascading fountains lose less water to evaporation.
23. Buy a rain gauge to track how much rain or irrigation your yard receives. Check with your local water agency to see how much rain is needed to skip an irrigation cycle.
24. Teach your family how to shut off your automatic watering systems. Turn sprinklers off if the system is malfunctioning or when a storm is approaching.
25. Set a kitchen timer when watering your lawn or garden with a hose.
26. Next time you add or replace a flower or shrub, choose a low water use plant for year-round landscape color and save up to 550 gallons each year.
27. Use a screwdriver as a soil probe to test soil moisture. If it goes in easily, don't water. Proper lawn watering can save thousands of gallons of water annually.
28. Avoid over-seeding your lawn with winter grass. Once established, ryegrass needs water every three to five days, whereas dormant Bermuda grass needs water only once a month.
29. Landscape with Xeriscape trees, plants and groundcovers. Call your local conservation office for more information about these water thrifty plants.
30. If you have an evaporative cooler, direct the water drain to a flowerbed, tree, or your lawn.
31. Leave lower branches on trees and shrubs and allow leaf litter to accumulate on top of the soil. This keeps the soil cooler and reduces evaporation.

32. Start a compost pile. Using compost when you plant adds water-holding organic matter to the soil.
33. Use sprinklers that throw big drops of water close to the ground. Smaller drops of water and mist often evaporate before they hit the ground.
34. More plants die from over-watering than from under-watering. Be sure only to water plants when necessary.
35. Water only as rapidly as the soil can absorb the water.
36. Aerate your lawn. Punch holes in your lawn about six inches apart so water will reach the roots rather than run off the surface.

COMMUNITY BEHAVIORS

1. Encourage your school system and local government to help develop and promote a water conservation ethic among children and adults.
2. Make suggestions to your employer to save water (and dollars) at work.
3. Support projects that use reclaimed wastewater for irrigation and other uses.
4. Encourage your friends and neighbors to be part of a water-conscious community.
5. Pick-up the phone and report significant water losses from broken pipes, open hydrants and errant sprinklers to the property owner or your water management district.

MISCELLANEOUS BEHAVIORS

1. Install covers on pools and spas and check for leaks around your pumps.
2. Periodically check your pool for leaks if you have an automatic refilling device.
3. Use a commercial car wash that recycles water.
4. Don't buy recreational water toys that require a constant flow of water.
5. Use a grease pencil to mark the water level of your pool at the skimmer. Check the mark 24 hours later. Your pool should lose no more than $\frac{1}{4}$ inch each day.
6. When the kids want to cool off, use the sprinkler in an area where your lawn needs it the most.
7. Make sure your swimming pools, fountains, and ponds are equipped with re-circulating pumps.
8. Bathe your pets outdoors in an area in need of water.
9. While staying in a hotel or even at home, consider reusing your towels.
10. When backwashing your pool, consider using the water on your landscaping

APPENDIX F – DROUGHT CONSERVATION EXAMPLES

Drought Conservation Measures

This plan uses a drought assessment system similar to the one used by the Southern Nevada Water Authority (SNWA) that includes the following levels of drought observation:

- Stage1: No Drought
- Stage 2: Drought Watch
- Stage 3: Drought Alert
- Stage 4: Drought Emergency

A staged assessment system gives specific measures associated with each stage of drought that can apply to water customers within the Canyon GID. The Table below summarizes an example of staged drought measurements that the Canyon GID can implement within its district.

Staged Drought Conservation Measures			
Stage	Reduction Goal	Information Measures	Water System Measures
STAGE1: No Drought	10%	Encourage conservation through educational efforts	Institute intensive leak reduction program, Reduce % of unaccounted for water. Increase enforcement.
STAGE2: Drought Watch	15-18%	Use media to communicate drought information, warn of potential for more stringent measures associated with succeeding stages. 1 st stage measures.	Reduce water use for flushing, public fountains, and public facility landscape irrigation. 1 st stage measures.
STAGE 3: Drought Alert	25-30%	Public officials appeal for water use reductions. Explain details of emergency. 1 st and 2 nd stage measures.	Prohibit all public water uses not required for health or safety. 1 st and 2 nd stage measures.
STAGE 4: Drought Emergency	50% or more	1 st , 2 nd , and 3 rd stage measures.	Prohibit all outdoor water use and selected commercial/industrial use. 1 st , 2 nd , and 3 rd stage measures.

Drought conservation measures implemented by customers can save more water than those measures applied by the water system. For this reason water customers must also be expected to employ special conservation measures during times of drought. Special drought conservation measures for water users have been divided into the following categories:

1. Fountains and Water Features
2. Government Facilities
3. Landscape Irrigation
4. Mist Systems
5. Parks and Community Use Areas
6. Pools
7. Surface, Equipment, and Building Washing
8. Turf Installation
9. Vehicle Washing
10. General Measures

1. Fountains and Water Features

Drought Measures for Fountains and Features			
Stage	Residential	Common Areas	Commercial
Watch	Fountains and features with a surface area of 200 ft ² or less allowed.	Same as residential but feature cannot be incorporated into an entry way of streetscape, as defined by local government and only one fountain or water feature may be operated.	May maintain a re-circulating water pool to sustain pumps, pond liners, surface coatings and ancillary equipment. The feature of fountain may run only between 1 a.m. and 4 a.m. or whenever freezing conditions require system preservation.
Alert	Fountains and features with a surface area of 25 ft ² or less allowed.	Same as Watch	Same as Watch
Emergency	Fountains and features not allowed.	Fountains and features not allowed.	Fountains and features not allowed.

2. Government Facilities

Drought Measures for Government Facilities	
Stage	Government Facilities
Watch	To be determined by Canyon GID after government facility needs have been established.
Alert	
Emergency	

3. Landscape Watering

Drought Measures for Landscape Watering		
Stage	Winter (Oct – Mar)	Spring, Summer, Fall (Apr – Sept)
Watch	No Watering	2 assigned days per week
Alert	No Watering	2 assigned days per week
Emergency	No Watering	To be determined

4. Mist Systems

Drought Measures for Misting Systems		
Stage	Residential	Commercial
Watch	Allowed, No restrictions	Use only for human comfort in June, July, and August and only between the hours of noon and 6 p.m.
Alert	Allowed, No restrictions	Use only for human comfort in June, July, and August and only between the hours of noon and 6 p.m.
Emergency	Not allowed	Not allowed

5. Parks and Community Use Areas

Drought Measures for Parks and Community Use Areas	
Stage	Parks and Community Use Areas
Watch	To be determined by Canyon GID after parks needs have been established.
Alert	
Emergency	

6. Swimming Pools

Drought Measures for Swimming Pools	
Stage	Swimming Pools
Watch	No restrictions. Pools should be drained into the sewer system so the water can be recycled.
Alert	
Emergency	Not to be filled during drought emergency

7. Surface Equipment and Building Washing

Drought Measures for Surface Equipment and Building Washing	
Stage	Surface Equipment and Building Washing
Watch	Prohibited unless water is discharged into the sanitary sewer through approved methods or contained onsite.
Alert	
Emergency	

8. Vehicle Washing

Drought Measures for Vehicle Washing		
Stage	Personal Vehicle Washing	Commercial Vehicle Washing
Watch	Once a week per vehicle using a hose with an automatic shut-off nozzle.	Only at a facility where water is discharged into the sanitary sewer through approved methods. Also with high-pressure, low-volume sprayer using less than 10 gallons per vehicle.
Alert		
Emergency	Not allowed	Not allowed

9. Turf Installation

Drought Measures for New Turf Installation		
Stage	Residential Single and Multi-family	Non-Residential
Watch	Allowed	Allowed within Landscape Code limits.
Alert	Allowed	Allowed within Landscape Code limits.
Emergency	Not allowed	Not allowed

10. General Water User Measures

General Drought Measures	
Stage	General Water User Measures
Watch	Mandatory restrictions on all outside uses by residential users, except landscape irrigation. Unnecessary outdoor uses by any commercial users prohibited.
Alert	All outdoor water use severely restricted. Serve water in restaurants only upon request.
Emergency	All outdoor water use and selected commercial and industrial use prohibited.

Emergency Conservation Measures

Water System Operational Measures

The following are examples of operation measures that could be implemented for a water emergency:

- Continue all actions from watch and alert stages (drought conservation measures), as appropriate.
- All emergency measures will be applied with any additional measures that Canyon GID considers to be necessary.
- The problem will be defined as an emergency by Canyon GID.
- Water use reduction goals will be established by Canyon GID. Single-family residences may be set as a per house allotment or as a percentage from previous years consumption. Commercial, multi-family, and industrial will be asked to reduce use by a percentage of the average of the previous year's consumption.
- Penalties or excess use charges will be established for customers that exceed their allotment.
- Canyon GID billing system could be adjusted to implement penalty or use charges.
- Enforcement actions will be increased.
- Inform local law enforcement of the need for assistance.
- Increase aquifer level monitoring actions.

Communication Measures

The following are the communication measures that could be implemented for a water emergency:

- Canyon GID will increase the frequency of reports to the board. The initial report will include the suggested nature and scope of proposed conservation measures. Subsequent reports should provide details on measure implementation and customer response to those measures.
- Provide status reports to entities with special interests, public agencies including the Douglas County, school districts, fire departments, and law enforcement agencies.
- Through a media campaign and direct mail announce to Canyon GID customers the:
 - Scope and nature of the measures.
 - Reasons for imposing the measures.
 - Water use reduction goals.
 - Enforcement mechanisms and fines.
 - Projections for how long the measures will be in place.
 - Penalty or excess use charges.
- Clearly identify any exemptions from the conservation measures.
- Inform customers about possible pressure reductions and any problems this may cause.

- Provide landscape firms with conservation measure information.
- Provide contractors and landscape companies with information on locations to obtain reclaimed water (effluent) for street cleaning, construction projects, irrigation, dust control, etc.
- Post updated status reports on the Canyon GID website.
- Post signs where possible that note major conservation measures.
- Continue to enhance communication measures. This includes increasing education and establishing a hotline for emergency updates.
- Keep fire departments informed on the status of the emergency and require that they discontinue the use of water in training exercises until the emergency is over.

Emergency Conservation Summary

Advance preparation is necessary for the successful implementation of emergency conservation measures. Public education prior to an emergency is essential. It is also important that communication systems (hotlines, websites, etc.) have been set-up in advance. Enforcement procedures including personnel assignments will also be outlined ahead of time.

APPENDIX G – WATER CONSERVATION WEBSITES

WATER

- <http://www.nacwa.org>
- www.energystar.gov

DROUGHT

- <http://droughtmonitor.unl.edu>

LANDSCAPE

- www.tmwlandscapeguide.com/landscape_guide/interactive/index.php

EDUCATION

- www.wateruseitwisely.com
- www.washoeet.dri.edu/

INSTITUTIONAL

- www.lvvwd.com
- www.snwa.com
- www.tmh20.com
- www.cabq.gov
- <http://www.water.ca.gov/wateruseefficiency/>

LEAK DETECTION

- www.who.int/docstore/water_sanitation_health/leakage/begin.html

HOW TO READ YOUR WATER METER

Locate Your Meter

Most water meters will be located outside in front of your house next to the curb on the street under a steel or concrete lid.

Reading Your Meter

There are two basic types of meters; a dial with a needle that measures in tenths of a cubic foot and a digital meter that measures from 100,000 down to 1 cubic foot. Most meters also have a small triangle on the face called a flow indicator. It will move when there is water passing through it. Read your meter from left to right.

Measuring Water Use Activities

It is possible to measure the water use of certain activities. These activities include but are not limited to the following:

- Shower or bath use
- Watering the lawn
- Washing clothes or dishes
- Flushing a toilet
- Washing a car

To measure the water use of an activity, do the following (in order):

1. Make sure all water off. This includes all faucets (inside and out), appliances, swamp coolers, or icemakers.
2. Write down the meter reading to two decimal places.
3. Perform the activity. Be sure to measure the amount of time in minutes that the activity required.
4. At the end of the activity read the meter again. Subtract the first meter reading from the second one. The result is the amount of water used for the activity in cubic feet. To convert to gallons multiply the result by 7.48. To determine how many gallons per minute were used divide the gallon amount by the number of minutes the activity required. You should now have the water used amount in *gallons per minute*.

Detecting Leaks

1. Make sure all water off. This includes all faucets (inside and out), appliances, swamp coolers, or ice makers.
2. Write down the meter reading and time of day to the minute.
3. Wait at least an hour before reading the meter a second time. Make sure no water is used during the test. Read the meter at the end of the test and record the time to the minute. If the flow indicator is moving during the test you may have a leak.
4. Subtract the first meter reading from the second. Multiply the remainder by 7.48. The result is the amount of water in gallons that passed through the meter during the test period. Also record the time duration of the test.
5. Divide the amount of water by the number of minutes in the test. The result is the amount of water that went through the meter in *gallons per minute*.
6. To measure amount lost over time multiply the gallons per minute by the following:

- 1,440 for gallons per day
 - 43,920 for gallons per month
 - 527,040 for gallons per year
7. Locating a leak is a process of elimination. Shut off one toilet at a time at the wall. Go to the meter and check to see if the flow indicator (triangle) is still moving. If the triangle has stopped you have discovered the leak. If not go on to the next one and repeat the above steps.
 8. Check your sprinkler system. Shut off the system at the anti siphon valve and check the meter.
 9. Check your main service line. You will need to shut off the valve between your house and the meter. If the meter stops the leak is between the meter and the valve.
 10. These steps can be repeated for every fixture and fitting in your home. In the event you cannot locate the leak, you should call a professional plumber to find and fix it.

APPENDIX I – EPA RESIDENTIAL BENCHMARKS

Type of Use	Likely Range of Values
INDOOR USES	
Average household size	2.0 – 3.0 persons
Frequency of toilet flushing	4.0 – 6.0 flushes per person per day
Flushing volumes	1.6 – 8.0 gallons per flush
Fraction of leaking toilets	0 – 30 percent
Showering frequency	0 – 1.0 showers per person per day
Duration of average shower	5 – 15 minutes
Shower flow rates	1.5 – 5.0 gallons per minute
Bathing frequency	0 – 0.2 baths per person per day
Volume of water	30 – 50 gallons per cycle
Washing machine use	0.2 – 0.5 loads per person per day
Volume of water	45 – 50 Gallons per cycle
Dishwasher use	0.1 – 0.3 Loads per person per day
Volume of water	10 – 15 gallons per cycle
Kitchen faucet use	0.5 – 5.0 Minutes per person per day
Faucet flow rates	2.0 – 3.0 gallons per minute
OUTDOOR USES	
Average lot size	5000 – 8000 square feet
Average house size	1200 – 2500 square feet
Landscape area	4000 – 5000 square feet
Fraction of lot size in turf	30 – 50 percent
Water application rates	1 – 5 feet per year
Homes with pools	10 – 25 percent
Pools evaporation losses	3 – 7 feet per year
Frequency of refilling pool	1 – 2 times per year